SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE, PUBLISHED MONTHLY

VOLUME III DECEMBER, 1906 NUMBER 6

SENILE PARENCHYMATOUS HYPERTROPHY OF FEMALE BREAST[1]

ITS RELATION TO CYST FORMATION AND CARCINOMA

BY J. C. BLOODGOOD, M. D., BALTIMORE

MALIGNANT tumors, as compared with other lesions of the breast, are the more frequent. At the present time the only recognized treatment for carcinoma of the breast is an extensive removal of the breast with an area of skin, both pectoral muscles, and contents of the axilla in one block, and, in some cases, the removal, in addition, of the contents of the supraclavicular fossa. (Halsted, 1.)

For non-malignant lesions of the breast a much less extensive operation is required.

The earlier a lesion of the breast is observed, the greater the difficulty in differentiating the benign from the malignant tumor. When it is impossible to make a clinical diagnosis of a malignant tumor, the diagnosis must be made from the appearance of the diseased area exposed at an exploratory incision, or from the microscopic examination of a frozen section.

For these requirements of the differential diagnosis, the surgeon must have sufficient pathological training to recognize the gross and microscopic appearances of the different breast tumors and inflammations. (Bloodgood, 2.)

In this paper I shall confine myself to a disease of the breast which is observed only during the cancer age, one which must be differentiated at all times from a malignant tumor, and at the same time, as it has a tendency to become carcinoma, the surgeon must be prepared to recognize the malignant stage of a lesion which is usually benign.

The life history of the female breast may be divided into the following periods: Infantile, puberty, lactation, the resting-stage of the adult breast, and the senile breast. In some women, lactation hypertrophy is absent, either from the fact that they never become pregnant, or, if they do bear children, because the breast does not lactate. It is interesting to note that the pathological lesion which I am about to describe — senile parenchymatous hypertrophy — is more frequently observed in the female breast which, for one reason or another, has never been the seat of lactation hypertrophy.

Fig. 1. Mammary gland. Embryo. (Billroth.)

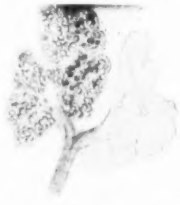


Fig. 2. Puberty hypertrophy. (Billroth.)

In the *infantile breast* (Fig. 1) there is found a number of branching epithelium-lined ducts surrounded by a connective-tissue stroma. (Billroth, 3.) It is not infrequent to observe dilatation (ectasia) of these ducts. When examined microscopically, the epithelial lining shows evidence of unusual proliferation, and the duct is filled with the *débris* of desquamated and degenerated epithelial cells. At birth, in such breasts, one observes a milk-like discharge from

[1] Abstract of paper presented with lantern-slide demonstration before the American Association of Pathologists and Bacteriologists, in Baltimore, May, 1906.

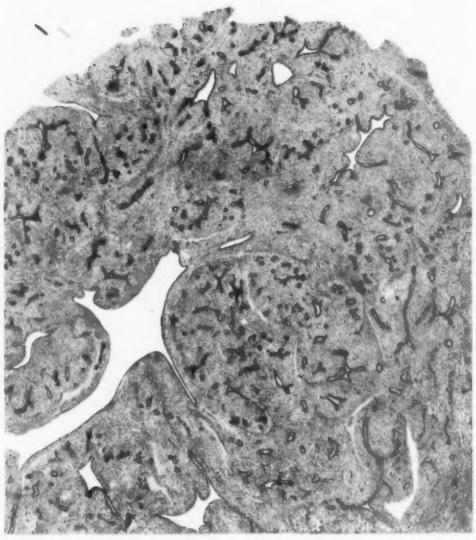


Fig. 4. Intracanalicular myoxma. Low-power microscopic drawing of tumor in Fig. 3.

the nipple. This lesion, which may be considered pathologic, always recovers spontaneously. Infection and mastitis, sometimes with abscess formation, have been observed more frequently in such infantile breasts.

Between this stage and puberty hypertrophy, the female breast is unusually free from both inflammatory and neoplastic pathological processes. In *puberty hypertrophy* (Fig. 2) two new elements appear: epithelium-lined acini, which arise by a process of budding from the already present ducts, and a characteristic myxomatous connective tissue which develops about the terminal ducts and acini. This connective tissue was first described by Billroth.

In this stage of the female breast, *fibro-epithelial* tumors are most common. In one variety the tumor is composed chiefly of a hypertrophy of the periductal myxomatous tissue, and is usually called an *intracanalicular myxoma*. (Figs. 3, 4.) Warren (4) has recently suggested the term *periductal myxoma*. The second form of fibro-epithelial tumor, *the fibro-adenoma* (Figs. 5, 6, 7), differs very little in its histological appearance from the normal breast, except that it presents an encapsulated and enucleable area. In the early stage of this tumor the epithelium of the present ducts and acini is of a higher type than the normal breast, and there is usually observed more cell proliferation, with some dilatation of the ducts and acini.

During or after puberty hypertrophy, there is also a pathological hypertrophy: *diffuse virginal hypertrophy*. (Figs. 8, 9, and 10.) Both breasts become enormously enlarged, the hypertrophy chiefly involves the connective-tissue stroma, but there is also, as observed in the fibro-epithelial tumors, a true hyperplasia of the parenchyma.

In the fibro-adenoma, as the tumor gets older, the epithelial elements show atrophy, and the tumor often becomes calcified. When the intracanalicular myxoma grows larger, it usually becomes a sarcoma. I have recently observed a carcinoma in a breast the seat of diffuse virginal hypertrophy. (Figs. 11, 12.) The patient was a colored girl, aged 22. Both breasts were unusually large. I am unable to find a similar case in the literature.[1]

True epithelial tumors or *adenoma* (Fig. 13)

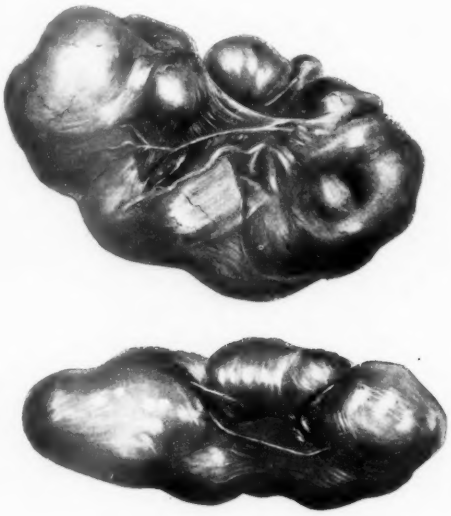


Fig. 5. Adenofibroma. Pen-and-ink sketch of tumor. Not cut. Two views.

[1] A second sarcomatous case has been seen in Dr. Halsted's clinic

are relatively very infrequent. They are seldom observed at puberty; more frequently between 25 and 35 years of age. They differ from the fibro-adenoma, in that there is relatively very little stroma. The epithelium-lined ducts and acini always show dilatation, and are lined with proliferating epithelial cells of a higher type. The gross and microscopic appearance of these cystic adenomas differs from senile parenchymatous hypertrophy only in the fact that they are encapsulated areas and found in the breasts of younger women; that is, cystic adenoma, in its histological appearance, bears the same relation to senile parenchymatous hypertrophy as fibro-adenoma to diffuse virginal hypertrophy, or, in comparing the breast with the thyroid gland, as an encapsulated colloid adenoma bears to simple colloid goiter, which may be looked upon as diffuse hypertrophy. Similar conditions are found in the prostate. Isolated and encapsulated areas are found there, not differing in their gross and microscopic appearance from the diffuse prostatic hypertrophy.

These cystic adenomas of the younger female breast show the same proclivity to become carcinoma as we observe in the diffuse parenchymatous hypertrophy of the senile breast.

A few months after pregnancy, *lactation hypertrophy* (Figs. 14, 15) begins, and is fully developed a few days after the birth of the child. Both breasts are larger. The gross appearance of the breast and its histology

Fig. 6. Adenofibroma. Section. Fresh specimen. The elevated pink dots are the adenomatous areas.

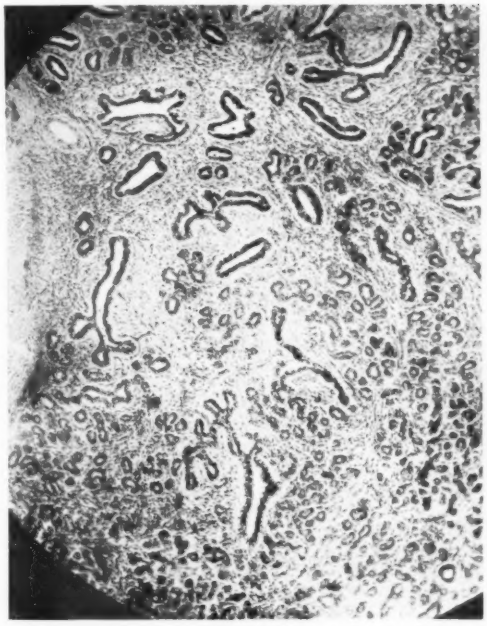


Fig. 7. Adenofibroma. Photomicrograph.

demonstrate that the enlargement of the breast is due entirely to hypertrophy of the epithelial element; the stroma disappears to a large extent. This lactation hypertrophy has a characteristic architecture of its own, easily differentiated, both in the gross and microscopic examination, from all other localized or diffuse forms of epithelial hypertrophy of the breast. During lactation hypertrophy, both benign and malignant neoplastic growths are unusual; the most common lesion is a lactation mastitis due to pyogenic infection. Pathologic hypertrophy may occur.

The menopause in women is observed at different ages, even in the same race. As a rule, it is earlier if lactation hypertrophy has not taken place. The disease which is the subject of this paper — *senile parenchymatous hypertrophy* — is most frequently seen, in this country, in women between 40 and 50 years of age, the usual period of the climacterium. In women whose breasts have not lactated, I have observed it before 40 years of age; the youngest was 33; although less

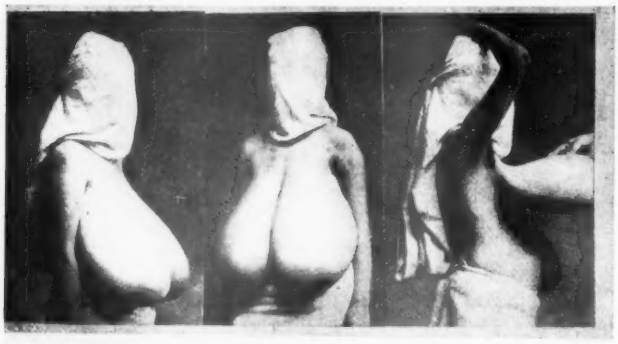


Fig. 8. Diffuse virginal hypertrophy. (Johnston's case.) Patient.

frequently the disease occurs in breasts with a history of one or more lactations. The shortest period of time between the last lactation and the estimated onset of the senile hypertrophy, in my experience, has been three years. Usually, in these cases, there is an interval of at least ten years between the last lactation and the first symptoms of the disease.

"SENILE PARENCHYMATOUS HYPERTROPHY" is a lesion distinctly of the senile breast; the pathological process is chiefly one of epithelial activity, therefore parenchymatous; and it resembles the pathological process — hypertrophy — much more than either an inflammation or a neoplasm. It may be considered a pathological hypertrophy, like diffuse hypertrophy of the virginal breast, and not a physiological process, like lactation hypertrophy.

Fig. 9. Diffuse virginal hypertrophy. Alcohol specimen. Section through breast. (Johnston's case.)

The lesion has been described under many terms, and some authorities have looked upon it as a form of chronic (cystic) mastitis, and others as a neoplasm. Schimmelbusch called it a cystadenoma; Réclus, an intra-acinous cystic epithelioma. In France it is frequently called "maladie de Réclus"; in Germany, Schimmelbusch's disease. More recently, Warren (4),

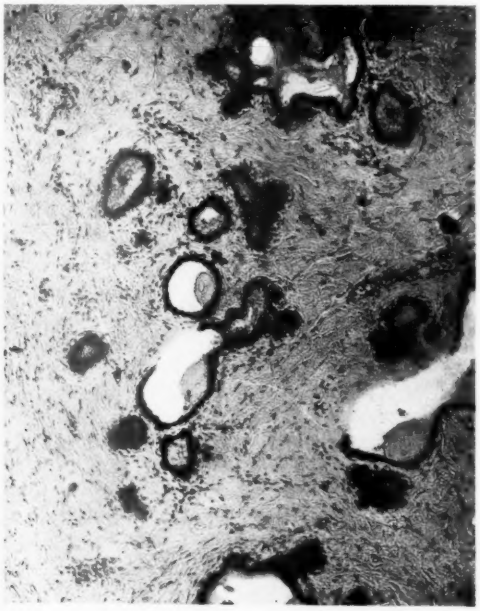


Fig. 10. Diffuse virginal hypertrophy. (Johnston's case.) Photomicrograph.

Fig. 11. Diffuse virginal hypertrophy, with carcinoma.

in discussing this disease, speaks of it as abnormal involution, and calls attention to the fact that Tietze (6) looked upon the lesion as a hypertrophy rather than a tumor, and that Bloodgood (5) had advocated the term "senile atypical parenchymatous hypertrophy."

The numerous and somewhat confusing nomenclatures are due to the fact that the lesion at various stages differs somewhat in its gross and microscopic appearance. As far as I have been able to ascertain from my clinical and pathological investigation, it can be looked upon as a single pathological process. For practical purposes it does not make any difference whether it is viewed as an inflammation, a benign neoplasm, or a hypertrophy. The important fact to be borne in mind is, that the lesion has a benign and a malignant stage. In the latter it should be recognized and subjected to the same operative treatment as any other cancer of the breast. In the former — the benign stage — we must recognize two types. The first may be called the *cystic*. In this form one finds in one or both breasts one

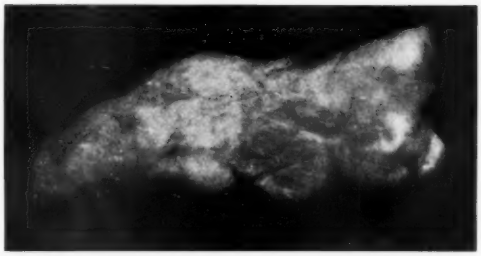


Fig. 12. Diffuse virginal hypertrophy, with carcinoma. Photograph of section through fresh tissue.

or more smooth-walled cysts. (Figs. 16, 17.) In this type, carcinoma is rarely observed. For this reason a conservative operation, consisting of excision of the cyst-wall, is justifiable. (Fig. 16.) The patient is relieved of the tumor formation without mutilation, and apparently runs no greater risk of a subsequent carcinoma in the remaining breast tissue than any other woman of the same age. In the second form, large cysts are never present; the disease consists of a localized enlargement of part of one or both breasts, and this enlargement is due to a parenchymatous hypertrophy in which the dilated ducts and acini are filled with proliferating epithelial cells. (Fig 18.) I have called this the *adenocystic type*, in distinction from the first, the cystic. Apparently it is this type that has been described by Schimmelbusch and those observers who look upon the lesion as a new growth. In this form, carcinoma (Fig. 18) is so frequent that I believe that in every instance the entire breast should be removed, and in some cases both breasts.

Fig. 14. Lacation hypertrophy. Photograph of alcohol specimen.

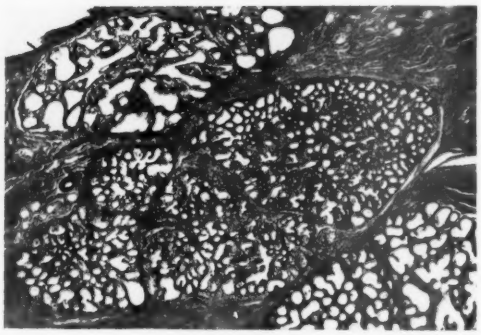


Fig. 15. Lactation hypertrophy. Drawing of microscopic section.

In the senile breast there should be an atrophy of both parenchyma and stroma. The atrophy of the parenchyma is usually more marked, up to its almost complete disappearance. The stroma never completely disappears. As the breast tissue disappears, it is replaced by fat. Nothwithstanding advancing age in some well-nourished women, the breasts do not perceptibly decrease in size. This is due to the fact that adipose tissue replaces breast tissue.

It is difficult to state how frequently parenchymatous hypertrophy takes place in the senile breast. Some observers say in twenty-five per cent. Apparently there is no doubt

Fig. 16. Single cyst in early stage of parenchymatous hypertrophy. Excision of cyst sufficient.

Fig. 17. Multiple cysts in senile parenchymatous hypertrophy. Excision of breast indicated.

that this senile pathological process may be present in one or more areas of one or both breasts, that it reaches a certain stage of development, and then spontaneously disappears. In such cases there are usually no clinical symptoms. I am inclined to think that this lesion is present in the breasts of those older women who consult physicians because of one or more areas of localized discomfort. On examining such breasts, one finds one or more areas in one or both breasts, usually multiple, in which the breast tissue is of firmer consistency than normal. Here operation is not indicated, but I am inclined to think that if these breasts were removed this hypertrophy would be demonstrable, for I have found it in breasts amputated for benign or malignant tumors.

The simple cysts, single or multiple, apparently, may arise at any stage from the onset to the end of this senile parenchymatous hypertrophy. The adenocystic type, if it develop at all, appears in the early stage, growing rapidly.

I have observed cysts in the breasts of women between the ages of 28 and 75. The two cases in which single simple cysts were observed in the breasts of women under 30 are unique observations. These women had never been pregnant. The surrounding breast tissue removed with the cyst was apparently normal. Four years later, one of these women returned with a second cyst in the same breast, and at the second operation the zone of breast tissue

removed with the cyst-wall showed the typical appearance of senile parenchymatous hypertrophy. This suggests that the disease may begin before 30, and that a cyst may form in such an early stage of the disease that it is difficult to differentiate from the normal breast. With these two exceptions the breast tissue surrounding the simple cyst has never been normal. I have always found the histological appearance of some stage of senile parenchymatous hypertrophy, or a definitely senile breast.

This suggests that simple cyst formation may take place in the onset of the disease, or as the residue of the parenchymatous hypertrophy which has almost completely disappeared spontaneously.

On the other hand, when the adenocystic type has been present, the hypertrophied zone in one or both breasts has been observed in comparatively younger women. As far as could be ascertained, the growth was rapid from the onset. In at least fifty per cent of the cases which I have observed, adenocarcinoma was already present.

Senile parenchymatous hypertrophy, according to its gross and microscopic appearance, may be divided into three stages: the adenomatous, ectasia, and the adenocystic. As a rule, all three are present in different degrees.

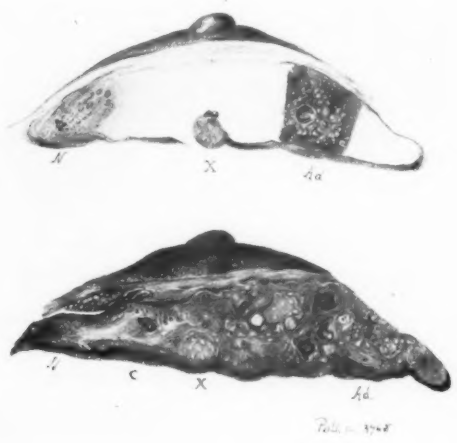


Fig. 18. Senile parenchymatous hypertrophy. Adenocystic type. Section through breast. *X*. Adenocarcinoma. *N*. Normal breast. *C*. Cyst. *Ad*. Adenocystic changes.

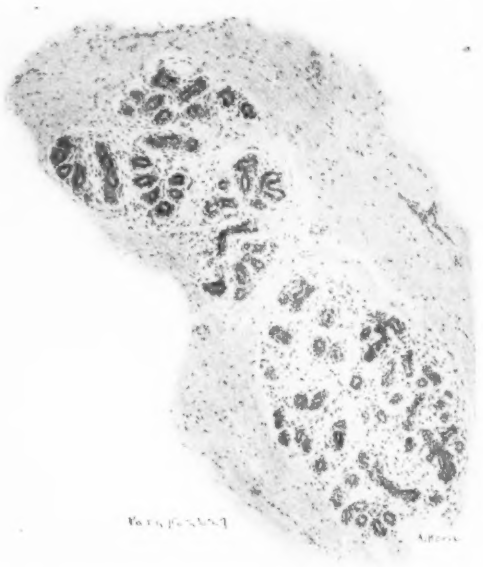


Fig. 19. Senile parenchymatous hypertrophy. Adenomatous stage. Microscopic drawing.

In the adenomatous stage we observe in the area of diseased breast more parenchyma than in the remainder of the breast. This parenchyma appears as small, elevated gray or pink dots. (Fig. 6.) Microscopically (Fig. 19), one finds in these areas more ducts and acini than in normal breast tissue. The architecture of the lobule of the normal breast is changed; the epithelial cells are of a somewhat higher type.

In the stage of ectasia the fresh appearance shows, in addition to an increased number of elevated pink and gray dots, minute cavities. (Fig. 18.) Microscopically (Fig. 20), the lumen of the ducts and acini is dilated, the epithelial cell is of a higher type, and there are various degrees of proliferation and degeneration. The little dilated cavities are filled with fluid or semifluid contents composed of *débris* of degenerated cells. In the dilated ducts this fluid frequently has a greenish color, and may be almost of the consistency of pastel paints. It is in this stage that further dilatation gives rise to cyst formation. As the dilated epithelium-lined cavities increase in size, the epithelium desquamates and finally disappears. (Fig. 21.)

Fig. 20. Senile parenchymatous hypertrophy. Stage of estasia. Microscopic drawing.

After a cyst reaches a certain size, one never finds an epithelial lining; that is, when ectasia is followed by cyst formation, there is a disappearance of the epithelial lining. This may explain the absence of carcinoma in that type of senile parenchymatous hypertrophy in which ectasia and cyst formation predominate.

The third or adenocystic change may be practically absent, present to a slight degree, or predominate in the entire picture. When this is the case, large cysts are never found; small epithelium-lined cysts may be present. In the adenocystic stage a quadrant or a hemisphere of the breast is much larger (Fig. 18); it is firmer in consistency; on section through the entire breast we can recognize the normal breast composed chiefly of stroma and little parenchyma; the adenomatous area composed of numerous elevated pink or gray dots, and the adenocystic area where there is less stroma, numerous minute cysts filled with epithelial *débris*, which can be expressed, and numerous minute areas, somewhat similar to the minute cysts, except that they are filled with white granular contents which cannot be expressed. (Fig. 18.) Microscopically, one finds the adenomatous (Fig. 19), the ectatic, (Fig. 20), and the minute epithelium-lined, cystic areas already described. In addition, there are areas with the same connective-tissue envelope present in the ectatic alveolus, or minute epithelium-lined cyst, but the cavity is filled with proliferating cells of a somewhat different type. The grouping of these cells assumes different forms; as a rule, it is somewhat papillomatous (Fig. 22); in some instances connective-tissue ingrowths are present, in others absent. The histological appearance is very similar to that pictured by Halsted (7) in the thyroid hypertrophy following partial excision of the thyroid gland in animals.

When carcinoma is present in the adenocystic type of the senile parenchymatous hypertrophy, it can be recognized by the firmer consistency

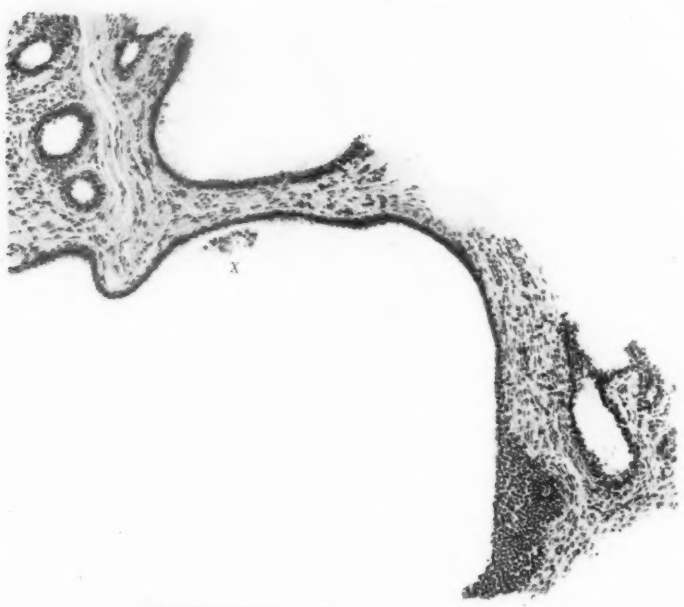


Fig. 21. Senile parenchymatous hypertrophy. Cyst formation. *X*. Desquamating remains of epithelial lining.

of the area, by the increase of connective tissue, and by its more granular appearance. The tissue also grates under the knife. Microscopically, there is little difficulty in recognizing the malignant change.

In a comparative gross and microscopic study of prostatic hypertrophy I find almost identical conditions, except that in the prostate, up to the present time, I have never observed large cyst formation. The adenomatous stage, the stage of ectasia, and the adenocystic stage are almost identical, and when the latter — the adenocystic — predominates, carcinoma of the prostate is very frequent. When the former stages only are present, I have never observed a carcinoma.

In breasts the seat of senile parenchymatous hypertrophy, a definite histological picture in the stroma which can be looked upon as inflammatory is seldom found. If this lesion is inflammatory in origin, it belongs to an inflammatory process in which epithelial activity predominates.

In a recent communication on thyroiditis by de Quervain (*Mittheilungen aus den Grenzgebieten der Med. u. Chir.*, 1905, vol. xv, p. 297), two forms are described. In one, the histological picture is definitely an inflammation. The dominant changes are in the stroma of the thyroid. Associated with these the parenchyma exhibits the picture, in some places, of atrophy; in others, of hypertrophy. This form of thyroiditis can be demonstrated to be due to a bacterial infection. In the other form, bacteria are absent. The lesion is found at autopsy in patients who died of some form of infection or intoxication, and the change in the thyroid is apparently due to the action of toxins. In this form of so-called toxic thyroiditis there is no change in the stroma, except hyperæmia and hemorrhage. The pathological process is confined chiefly to the parenchyma. The process is one of epithelial-cell activity, resembling somewhat the hypertrophy observed in exophthalmic goiter, or the hypertrophy described by Halsted after the partial removal of the thyroid in animals. It has occurred to me that it is perhaps justifiable to look upon senile parenchymatous hypertrophy of the breast and the prostate as of the same ætiological origin as the toxic thyroiditis. So far, in the breast

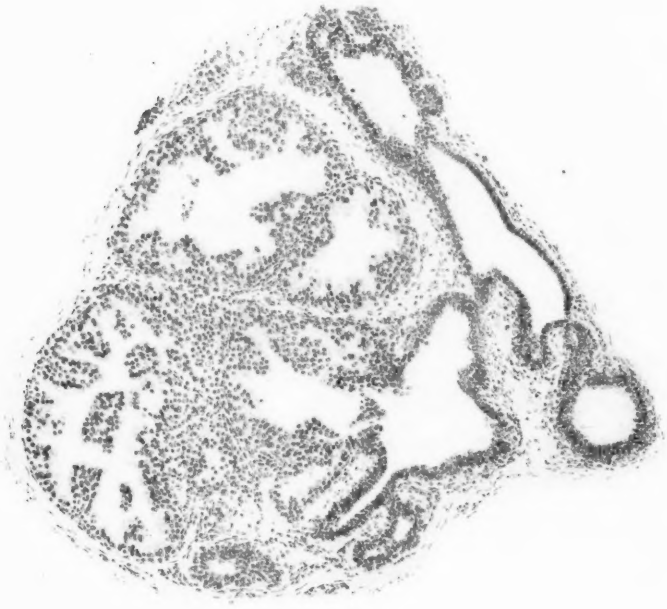
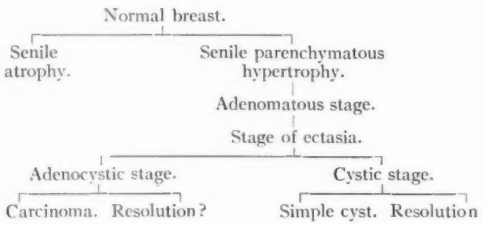


Fig. 22. Senile parenchymatous hypertrophy. Adenocystic stage. Microscopic drawing.

and prostate, as in toxic thyroiditis, bacteriological studies have been negative as to the presence of organisms. In the prostate the toxin may come from the testicle, because after the removal of the testicle the epithelial hypertrophy does disappear to a certain extent. During the menopause in women, many clinical symptoms are present which suggest some form of an intoxication. This view is advocated chiefly for the reason that it adds interest to the comparative pathological study of a somewhat similar lesion in these three glands, the function of which is widely different. To the surgeon it is of the greatest practical importance to investigate further the relation between senile parenchymatous hypertrophy of the prostate and breast to carcinoma. The earlier recognition followed by proper operative intervention will undoubtedly increase the number of permanently cured cases when the malignant stage is present, and save the patient from an unnecessarily extensive operation when the lesion is distinctly benign.



BIBLIOGRAPHY[1]

1. HALSTED. Trans. Amer. Surg. Assoc., vol. xvi, 1898, pp. 144, 180.
2. BLOODGOOD. Jour. Amer. Med. Assoc., Nov. 3, 1906, vol. xlvii, p. 1470.
3. BILLROTH. Deutsche Chirurgie, 1880, l. 41.
4. WARREN. Jour. Amer. Med. Assoc., July 15, 1905, vol. xiv, p. 160.
5. BLOODGOOD. Jour. Amer. Med. Assoc., Aug. 6, 1904, p. 367.
6. TIETZE. Deutsche Zeitschr. f. Chir., 1900, vol. lvi, p. 512.
7. HALSTED. Johns Hopkins Hospital Reports, vol. i.

[1] This literature is by no means complete. Warren gives the references up to 1904. In a second communication I will attempt to discuss the literature since that time.

PERIPHERAL VERSUS INTRACRANIAL OPERATIONS FOR TIC-DOULOUREUX

By C. H. MAYO, A. M., M. D., Rochester, Minnesota
Surgeon to St. Mary's Hospital

THE effectiveness of remedies for the cure of a disease is usually in inverse ratio to the number; and of all diseases that are not fatal, probably facial neuralgia is one of the most distressing and one of the most difficult to cure.

The pathology of this complaint we will not discuss, but it is probably an ascending change in the periphery of the nerve, which may be entirely in its vascularization. Removing the ganglion prevents regeneration. The changes in the ganglion, claimed by some observers, may not ultimately be proven, otherwise only intracranial operations would be indicated.

As in other diseases which exhibit natural remissions, undeserved credit is occasionally given to remedies because they are being used at the time the improvement occurred. We will not attempt to enumerate the great number of drugs employed for the relief or cure of neuralgia; the most of them had a purely empirical origin. Those most commonly used are castor-oil, strychnine, and atropine.

External treatment of the disease has been almost as varied as the internal; all manner of application of heat, cold, drugs, liniments, and lotions having their testimonials of cure. Electricity is employed in the form of electrolysis and high frequency current. The Röntgen ray has been used, as well as thorium and radium; De Courmeller reporting three cases benefited by the latter method.

The number of surgical and semi-surgical methods for the relief of this trouble are probably greater than that ever advanced for the cure of any other disease. Of the methods which are supposed to exert a favorable effect upon the nerve, we mention Desplat's injection of air into the tissues supplied by the nerve branch involved. The air requires a few days for absorption, and then the treatment is repeated.

Dr. A. H. Ferguson has had good results follow the injection of salt solution into and about the Gasserian ganglion by a long hypodermic needle. It is possible that the injection of boiling water into and about the foramen of peripheral exit of the nerves might also be of benefit, after the method of Wyeth in the cure of large angioma. The use of osmic acid in 1½ per cent solution injected into and about the nerve, as advocated by W. H. Bennet and described by J. B. Murphy and numerous others in reports of cases benefited, shows that fearless surgeons are constantly on the lookout to secure some safe and simple method of relief. Ligation of the common carotid has been done, as well as removal of the upper sympathetic ganglions. In those cases which were reported *early*, the benefit was as marked as that often noted in the reports of surgical treatment of epilepsy.

While the motor nerves require a favorable opportunity for reunion, it is a most difficult matter to *prevent* the regeneration and return of function of the sensory nerves. For instance, in the dissection of glands of the neck, a cut spinal accessory requires careful approximation; the bundle of sensory cervical nerves, on the contrary, can all be removed, yet sensation usually returns in a few months.

The impulse of the motor nerve being outward from the center, the peripheral end degenerates, but not so much if mixed with sensory fibers, in which case the function is from the periphery to the center; the nutritive cells in the sensory fibers being ganglionic, while in the motor nerves they are central and in the cord. Dr. J. B. Murphy's work on the regeneration of the nerves shows that repair occurs where there is an axis cylinder covered by the sheath of Schwann; that without this neurilemma there is no repair, as in the brain and upper cord structures.

Of those operations which were directed at the nerve affected, we have stretching the nerve, and this was done as early as 1748. As a

method, it gives such a brief respite that it is not warranted. Division is but little better, as union is very rapid. Resections of portion of the nerve according to the degree of separation interpose difficulties of regeneration, yet restoration of function usually occurs in from six months to two years. J. Ewing Mears recommended the removal of the Gasserian ganglion in 1884, and this was carried out by Rose in 1890.

To accomplish the removal of the upper or supra-orbital branch, an incision is made in the eyebrow, or just below it, and the nerves are sought for as they pass over the supra-orbital origin. They are tortioned after Thiersch's method, which winds the nerve on a blunt forceps by rolling on the forceps one half-turn or less to the second of time, making the distal and the proximal portions of the nerve pull against each other at the margin of the bone. We usually wind one way until tight, and then roll in the opposite direction and repeat.

The infra-orbital may be removed by many methods. Among them are those made by lateral incisions with resection of zygoma, resection of malar bone, tunneling the superior maxilla through the antrum, exposing on the floor of the orbit, and deep subcutaneous division with a small knife at the back of the orbit, the anterior portion of the nerve being withdrawn. It is also readily exposed for tortion removal at its exit from the infra-orbital canal about one fourth of an inch below the mid-point of the infra-orbital margin.

The inferior maxillary nerve is removed externally by deep dissection beneath the angle of the jaw (Sonnenberg's operation), exposing the nerve where it enters the dental canal. Another method is by lateral incision over the ramus and notching the bone or trephining and tortion removal of the nerve, and this is also done in the line of the canal or at the mental foramen. At the latter point it can be removed from the mucous side.

The intrabuccal method of Paravicini exposes the nerve from within the mouth by opening the mucous membrane back of the last molar tooth, and, by keeping close to the bone, the nerve is sought for where it enters the foramen of the dental canal of the ramus, a sharp spine of bone marking the opening. The gustatory is easily found on the lateral floor of the mouth by drawing the tongue out and to the opposite side. The nerve can be felt as a tight cord passing laterally from the jaw to the tongue, and is exposed by merely perforating the mucous membrane and hooking it up. It is removed by the same windlass method as before described.

The methods of intracranial removal of the Gasserian ganglion are numerous, and have been well worked out by many surgeons — Hartley and Krause in the early development, and, more recently, by H. Cushing of Baltimore. It is needless to tell those surgeons who have had experience with the intracranial operations that it may become one of the most tedious in surgery; again, it may be exceptionally easy. Krause, at the time of his report of 27 operations and 3 deaths, says that the time required for the operation is from $1\frac{3}{4}$ to 3 hours, and this has been our experience with the method. Various reports give the mortality at from 10 to 15 per cent, and over 5 per cent, from various causes, are not completely cured of the disease.

It is not the purpose of this paper to decry the intracranial type of operation, as it must often be employed where other methods have failed, and in certain cases, especially in involvement of the supra-orbital. The method may also be used as a primary operation when all the branches are involved. It is our experience that the cases in which the supra-orbital is implicated are almost impossible to cure by peripheral operations, the several branches of the upper trunk not being removed. This is also true of the buccinator nerve, a branch of the third division passing to the angle of the mouth.

Many cases come for relief having only one, branch, or at most two branches, involved. These patients are not ready to have, nor can some of them be induced to have, an intracranial operation to remove the ganglion. Others, who should have the ganglia removed, wish to try some simple, although less reliable, method first.

Dr. Abbe, ten years ago, advocated the intracranial implantation of rubber tissue to cover the foramen of exit of the various branches of the trigeminal after their resection. This effec-

tually prevented the regeneration or reunion of the nerves, and a further report was made in 1903, showing permanency of cure.

Shortly after the original report of Dr. Abbe was made, the writer, accepting the idea of interposing mechanical difficulties to the nerve union, had occasion to try the following method. In an operative case, after making a removal of the infra-orbital, in which this branch alone was involved, plugged with silver the foramen of exit. At various times since, silver screws were used to plug the foramen of peripheral exit of the second branch when removed; later, the method was applied to the inferior dental nerve.

The first case remained entirely well for seven years, when he had a few twinges of pain, and within a few months recurring attacks became quite severe. Osmic acid was then injected about the foramen of exit, which gave relief for six weeks, when a recurrence of pain brought him again to the operating-table. Incision showed that the silver plug, being too smooth to be firmly fixed, had come out of the canal and rested at the side of the opening. The nerve was as large as at the first operation. It was again removed by Thiersch's windlass method, and the opening plugged with a silver screw, using an ordinary screwdriver for the purpose. This patient has had no pain since, now over a year. No case with the screw inserted has complained of the nerve blocked, and some have been thus obstructed several years.

In some cases, but not extending over so long a period, the inferior dental canal has been opened externally about the point where it passes from the ramus to the body of the bone, the nerve extracted, and the canal plugged with lead. Soft silver or amalgam could be used.

In all cases the gustatory is removed, whether complained of or not, as we believe it is a possible source of reflex irritation upon the branch causing the pain.

1. Screw in infraorbital canal.
2. Screw in mental foramen.
3. Trephine opening if canal is plugged.

Although there are a large number of branches from each division of the trigeminal, it is quite common that the infra-orbital may alone be affected. The inferior dental may be associated with it without the orbital nerve being implicated, or any other branches of the second and third divisions. Peripheral operations with closure of the canals are indicated in such cases.

In patients in whom the intracranial operation is made, the surgeon should have at hand a thin lead or silver plate, which should have a projection to drop into the foramen ovale to maintain its position. The plate should be of such size and shape as to extend over the foramen rotundum. In the few cases in which the removal of the ganglion presents unusual difficulties, such a plate can be inserted after section of the nerves, or if not at hand, the rubber tissue should be used to obstruct the foramen.

These operations are classed under the head of minor surgery with little disability.

TENDON TISSUE VERSUS CATGUT LIGATURES[1]

By NICHOLAS SENN, M.D., PH.D., LL.D., CHICAGO
Colonel and Surgeon-General of the State of Illinois; Lieutenant-Colonel and Chief of the Operating Staff with the Army in the Field during the Spanish-American War

"*The absorbable aseptic catgut ligature is Lister's greatest invention.*" — PROFESSOR VON NUSSBAUM.

THE physicians who have received their medical education and training since aseptic surgery came into general use can hardly realize the force of the meaning, and much less the practical significance, of the above quotation from the pen of one of Germany's greatest surgeons of modern times. Those of us who were born early enough to attend the surgical clinics under the old *régime* comprehend fully its import. We shudder when we think of the old ligature and the many disastrous complications which followed its employment. It consisted of a silk thread of convenient length, and the only instruction we had to follow in preparing it for immediate use was to wax it thoroughly to render it more secure. After tying the vessel with sufficient force to crush the two inner coats, one end of the ligature was cut short to the knot, and the other was brought out through the wound and fastened on the surface with a strip of adhesive plaster. After an operation requiring ligation of one or more large vessels, the elimination of the ligatures was one of the most important events in the after-treatment of the case. Suppuration was regarded as a favorable indication in hastening this process and in preparing the wound for speedy healing by granulation. During operations, for convenience' sake, many surgeons were in the habit of holding the ligatures between their teeth; others, more tidy, placed them in the buttonhole of the lapel of the coat. Centuries of experience with the old ligature sufficed to teach the surgeons that the material employed had to be eliminated or removed before the wound could heal. We did not know at that time why suppuration was so constant, or why thrombo-arteritis, thrombophlebitis, pyæmia, erysipelas, hospital gangrene, sepsis, and secondary hemorrhage were so frequent. In the light of the teachings of modern aseptic surgery, we know that these grave wound complications were caused by unclean ligatures, sponges, hands, and instruments. It was the difficulty encountered in rendering ligature and suture material aseptic that retarded the early progress of aseptic surgery. Hand disinfection and sterilization of suture and ligature material were the stumbling-blocks which for more than two decades delayed the perfection of aseptic methods in the operating-room. An immense amount of genius and energy has been expended in perfecting this part of the aseptic surgical technique. The idea that silk ligatures could remain in the system indefinitely without any ill results, or that they possibly might become absorbed, engaged the attention of London surgeons during the time of Sir Astley Cooper in 1815 Lawrence and Cardarine made experiments on animals, and each of them reported a successful case. Encouraged by these results, Lawrence, Watson, Hodgson, Cumin, and a number of Neapolitan surgeons, tried this method in man, but, without exception, the ligatures which had been cut short to the knot maintained suppuration until they were eliminated or removed. Sir Astley Cooper then tried catgut, believing that by using animal material the chances of absorption or encystment of the ligature would be enhanced.

In his first case the healing of the wound was completed on the twenty-first day; in another patient, who was 80 years old, the wound took but four days to cicatrize, and in neither case did the ligature ever reappear. Norman made use of the same method, but was not so fortunate. The repeated failures with the same material in the hands of other operators soon led to its abandonment. Galen had used violin-strings as a suture material with the same expectations, but was similarly disappointed. A year before Sir Astley Cooper advocated the substitution of animal material

[1] Read before the Association of Military Surgeons of the United States, at the Buffalo meeting, 1906.

for silk, an American surgeon, Physick of Baltimore, according to Jameson and Dorsey, conceived the idea of using tanned deerskin for the same purpose. He gave to his deerskin ligatures as much as two lines in breadth, and increased their tensile strength, to a greater or less degree, by drawing them between the finger-nails. Malgaigne commented on the ligatures of animal tissue as follows: "If we admit that these ligatures, when left around the artery, do not act the part of foreign bodies they may be absorbed by the system, and are not necessarily obliged to be expelled from it at a period sooner or later, there is no person who cannot comprehend at a glance what advantages they would give to the patient, but before adopting them in surgery requires new experiments, and, also, that the results mentioned by Jameson should be confirmed by other practitioners."

More than half a century ago, two American surgeons, Paul Eve of Nashville and Christian Linde of Oshkosh, made use of split deer tendon as a ligature material; but the results do not appear to have been encouraging, as this practice found no imitators.

THE ASEPTIC ANIMAL LIGATURE

"The treatment of hemorrhage is the foundation of all surgery." — OTTO WEBER.

We can readily understand now why all trials with animal tissue, as a suture and ligature material, failed before asepsis was made the essential feature of the preparatory and operative technique. The employment of aseptic precautions and the use of sterilized animal tissue as a material for ligatures and sutures have made surgery, what it is to-day, nearly a perfect art. Certainly, Lister's greatest invention, the absorbable aseptic catgut ligature, has met Otto Weber's expectation of the perfection of surgery expressed in the sentiment, "The treatment of hemorrhage is the foundation of all surgery." To this we must add that the same material employed so successfully in definitely arresting hemorrhage by ligation of the bleeding vessels serves an additional, almost equally important, purpose in enabling the surgeon to unite similar anatomical parts severed by accident or operation by the employment of the buried absorbable suture.

To Lord Lister belongs the credit of having shown the way to the successful employment of animal tissue as a ligature and suture material. His original method of sterilizing catgut has been abandoned long ago, but the principles he taught and practised remain unshaken by subsequent investigations and experiments, which slowly but surely led to more simple and reliable methods of sterilization. Chemical agents, dry and moist heat — all have had their advocates in the sterilization of catgut, and by a slow process of evolution we have finally succeeded in rendering the material practically sterile without impairing its tensile strength. During the transition stage from unabsorbable to absorbable ligature and suture material every surgeon has had in his practice his share of failures. The frequency with which stitch abscesses occurred after operations performed under strictest aseptic precautions induced many of the most noted operators to abandon catgut and return to silk as the exclusive material for ligatures and sutures. There was a time when this backward step in surgery was justifiable. The sterilization of silk by boiling and reboiling assures absolute asepticity, and in the great majority of cases, especially if fine threads are employed, ligatures and buried sutures of this material become encysted. But exceptions do occur in the practice of the most painstaking surgeons. Nature abhors the presence of foreign bodies in the tissues, and the cases are by no means rare in which, after a primary wound healing, the silk is eventually eliminated, perhaps weeks, months, or years after the apparent complete repair of the wound. Other surgeons preferred metallic sutures to either silk or catgut, owing to the ease with which wires can be sterilized and kept aseptic, and with a view of effecting the mechanical union with the nicest accuracy and securing an unyielding hold on the approximated tissues. But metal is more obnoxious to the living tissues than silk. The latter permits of infiltration of its meshes by new tissue, and yields readily to movements of adjacent parts, while the compactness and resistance of the former make it an uncompromising alien to its immediate neighborhood. The surgeon who relies on the metallic suture — gold, silver, or bronze aluminum wire — in holding living tis-

sues in permanent apposition by this mechanical aid will sooner or later learn to his sorrow that nature does not tolerate such interference for any length of time. The tissues included in the suture are, in the course of time, invariably cut through by the unyielding ring, which, at best, becomes encapsulated somewhere in the vicinity of the place where it was applied, but frequently seeks the easiest and nearest route to a surface where it can escape or else be removed from the unfriendly surroundings. These remarks apply with special force to hernia operations. The ideal suture is the one which furnishes the requisite tensile strength for a sufficient length of time for the united parts to form an organic unyielding union, and after having fulfilled the mechanical indications, is removed by absorption and substitution of living for dead tissue. Silk, wire, silkworm gut, horsehair, and other unabsorbable substances, will continue to command the confidence of the profession as material for removable sutures, but cannot hold their present position in surgery as buried sutures. In the abdominal cavity, silk is my favorite suture and ligature material, and, if the wound heals by primary intention, very seldom gives rise to late complications, as the foreign substance is surrounded by tissues noted for their intrinsic power to effect speedy and firm encapsulation. The employment of metallic sutures will at no distant time be limited to the suturing of bone. The ideal material for ligatures and buried sutures of the future will be animal tissue made sterile by effective, safe bactericidal agents, which not only destroy the existing bacteria, but which at the same time have the power to neutralize the toxins which they may have generated in the dead tissue, and which possess the necessary tensile strength to meet the mechanical indications for a sufficient length of time until their presence and function have become superfluous by the completion of the process of repair, when they are removed by absorption and their space occupied by living tissue.

For centuries, surgeons have been in quest of such a material, but it was reserved for Lister to lead the way to a satisfactory solution of this important scientific and practical problem. Of all animal tissues, catgut has had the most extended trial, and has come into general use wherever surgery is practised. Other animal tissues have been recommended and used, but have never become a serious rival of catgut. The parietal peritoneum of the larger domestic animals has been cut into strips and twisted into cords to serve as ligatures. Mr. Barwell, in tying large arteries, used a broad ligature made of the strong middle coat of the ox's aorta. In sixteen cases it proved successful. He believed that this tissue is not absorbed, but is organized, and becomes a part of the surrounding tissues. In his first communication on the use of catgut, Lister entertained the same belief, but such views in regard to the fate of any of the dead animal tissues implanted in the living tissues of man or animals have been abandoned long ago.

In 1873, Ischiguro, ex-surgeon-general of the Japanese army, reported favorably on the use of whale tendon as a substitute for catgut. His paper attracted considerable attention in Germany and Holland, but the subject was soon lost sight of and has not been revived since. In 1879, Gridlestone of Australia published his first paper on kangaroo tendon as a superior animal tissue for ligatures and sutures. H. O. Marcy became the champion of this material in this country two years later, and has used it exclusively since. It was through his vigorous writings and brilliant example that the kangaroo tendon ligature and suture became a strong competitor of catgut in the practice of many American surgeons. It is only proper to state here that when I visited Australia two years ago I made inquiries and examined different samples of the so-called kangaroo tendon, and found that most of the material imported was not kangaroo tendon, but the tendon of a much smaller but more numerous animal, the wallaby. The tendon of the kangaroo is very coarse, and the smallest fibers obtainable are the size of an ordinary knitting-needle, while the tendon of the wallaby is made up of much finer fibers

In 1884, H. W. Dudley, in a paper published in the Transactions of the Texas Medical Society, entitled "Animal Ligatures and Sutures; Tendons of the Lepus or Mule-eared Rabbit as a Means for the Arrest of Hemorrhage and the Closing of Surgical Wounds," advocated the employment of the split tendons

of the jack-rabbit. I have seen no mention of any one else using this material. It is quite certain that some American surgeons have used the sterilized deer tendon, but of this I have no reliable information. From these notes we must draw the conclusion that catgut is the only animal tissue that has held the confidence of surgeons from the dawn of aseptic surgery until the present time.

PREPARATION OF RAW CATGUT

What is catgut? Why this material was ever called by this name is unexplainable, because catgut literally means the intestine of a cat, while the catgut in use is made of the small intestines of the sheep.

The fresh intestines are cleansed and macerated for twelve hours in running water; then the inside and outside surfaces are scraped with a dull knife, the intention being to remove the mucosa, the transverse fibers of the muscular coat, and the peritoneum, leaving only the subserous tissues with a small part of the longitudinal fibers. After treating the remaining middle layer for a time in a solution of carbonate of potash, and after careful rinsing, the moist threads are twisted on a ropemaker's wheel; then they are sulphurized, dried, polished with glass-powder, and finally rubbed with olive-oil. It requires no stretch of the imagination to realize that in the mechanical preparation of the intestine, parts of the intestinal coats which should be removed remain. In examining numerous transverse and longitudinal sections of raw catgut in the surgical laboratory of Rush Medical College, we had no difficulty in finding remnants of the mucous lining and transverse muscular fibers. The material is taken from a part of the animal always the seat of pathogenic bacteria. What remains or should remain of the intestinal wall are the longitudinal muscular fibers and the loose meshwork of the subperitoneal connective tissue. By twisting, the tensile strength of the material is increased. The looseness of the tissues renders them highly hygroscopic, which can be readily demonstrated by immersing raw catgut in a warm physiologic solution of salt. The threads increase in bulk, and thereby their elasticity is increased. This is perhaps no disadvantage when catgut is used as a direct ligature, but when employed as a ligature *en masse* or as a suture, its mechanical reliability suffers. The tetanus bacillus and its spores, so common in meadows and barnyards, are common inhabitants of the intestinal canal of sheep, and in case of imperfect removal of the mucosa and its glandular appendages are very liable to remain in the tissues out of which catgut is made. The spores of the tetanus bacillus are very resistant to all methods of sterilization, and I have personal knowledge of several cases of tetanus which could be traced to no other source than the catgut employed in the operation.

Ordinary catgut has not a good reputation in the suturing of wounds when it becomes necessary to secure accurate coaptation of important structures by mechanical aids for at least two or three weeks, as, for instance, in radical operations for hernia. By the absorption of the tissue fluids the sutures swell, lose their tensile strength, become more elastic, and yield enough to interfere with an ideal healing of the wound. It is for this reason that silk and metallic sutures take the precedence of catgut in the practice of many surgeons in closing abdominal wounds, and in all operations in which the mechanical aids must be relied upon for at least two or three weeks in obtaining an ideal wound-healing Muscle tissue, of which catgut is largely composed, is a poor material to rely upon as a suture. The anatomic arrangement of the connective tissue of the subperitoneal coat is not much better, as its elasticity is greatly increased by the imbibition of the tissue fluids. Finally, the twisting of the muscular and connective tissue fibers is the most serious objection to the make-up of the catgut suture. Catgut can be relied upon as a ligature material, as in my experiments "On Cicatrization of Blood-vessels," made in 1884, I ascertained that obliteration in arteries takes place in from four to seven days, according to the size of the vessel, and in veins in from three to four days. As a material for buried sutures it is inferior to more permanent animal tissue, as during the same series of experiments it was shown that medium-sized catgut is completely absorbed at the end of fourteen days, and of course long before the expiration of that time has lost its function as a mechanical support.

More durable catgut, such as chromicized catgut, overcomes these objections only to a certain extent, but even this, the most resistant preparation of catgut, has its serious defects when it becomes necessary to make use of sutures which must hold the tissues in uninterrupted, accurate contact for a period of three or more weeks, in order to obtain a satisfactory healing of the wound.

TENDON TISSUE

The compact non-elastic tendon tissue of some of the larger land and sea animals furnishes the most desirable and useful material for buried sutures and ligatures The primitive fibrils of firm, non-elastic tendons are arranged longitudinally, and will not yield under the traction to which they are exposed when employed as sutures or ligatures. The dense connective tissue of which tendons are composed is but scantily supplied with blood-vessels, and is less subject to microbic invasion than any other tissue in the body, with the exception of cartilage. The comparative avascularity of tendon, the compactness of the fibers of which it is composed, resists cell invasion and absorption for a much longer time than muscle, elastic, and loose areolar tissue. The tendon suture of the same size as catgut, and prepared in the same manner, can be depended upon to serve much longer as an efficient mechanical support than catgut.

TENDONS OF ARCTIC SEA ANIMALS AS SUTURE MATERIAL

I became interested in tendons of large sea animals as a substitute for catgut last summer, during my trip to the heart of the Arctics with Commander Peary, the well-known explorer of the Arctic regions. I went with him as far north as Etah, the most northern habitation of the Eskimos, 650 miles from the north pole. We visited all of the settlements from North Star Bay to Etah. and I was thus given a rare opportunity to study the life, habits, and manners of the aborigines of that region. The skill of the Eskimo women as seamstresses attracted my attention. They prepare the skins of the fur-bearing animals and convert them into clothing and boots. They make their own thread out of the tendon of the narwhal. The narwhal (*Monodon monoceros*) is a huge sea beast, ordinarily twenty feet in length. On each side of the spine is a broad, long tendon, which furnishes the sewing material. After drying this tendon, the women chew it, and strip it into threads of suitable size for their different kinds of sewing. Boots made by these women are water-tight, and only the most prolonged and hardest kinds of usage has any effect on the seams. Delicate threads a yard in length are the pride of the Eskimo women in sewing the fur coats and trousers for themselves, their children, and their husbands. I was not slow in appreciating the fact that threads made of the narwhal tendon are durable, and would, in all probability, on trial, prove to be an excellent substitute for catgut. The narwhal appears to select the upper part of Inglefield Gulf as a favorite feeding-ground during the short summer months. When we arrived in that part of the Arctic waters, the natives had killed a young narwhal on that day and brought it on board of our ship. When the animal was cut up, I secured the entire tendon on one side of the spine, which was as wide as a hand, and at least four feet in length. I hung it up in the rigging, and after it was dried the women chewed it and stripped it into threads. On my return I iodized the threads by immersing them eight days in a one-per-cent aqueous solution of iodine, and began to use them in my operative work at St. Joseph's Hospital. The results were all that could possibly be desired. In only one case out of more than fifty did a stitch abscess form, and the infection in this case could be traced to careless handling of the sutures. I studied the time of absorption of the material by using different sizes of the threads as deep, removable sutures, which were removed from one to three weeks after the operation. At the end of one week the sutures showed but slight changes from absorption. At the end of two weeks they were still firm, but the part of the ring in touch with the soft tissues was reduced about one half in size. At the end of three weeks the sutures had undergone advanced absorption, but were strong enough to hold the parts which they embraced in accurate coaptation. The fresh tendons of the sea animals in the Arctic regions are not only aseptic, but slightly antiseptic, as these animals

imbibe iodine from the sea water, and ingest it with their food. This material could be obtained for a trifle from the natives, through the agency of whalers who visit the east coast of Greenland annually. One day, near the mouth of Inglefield Gulf, our party killed fifteen walruses and one seal, and I secured enough tendon material for trial. The tendons are disposed like those in the narwhal, on each side of the spine. The fibers, however, are coarser, and cannot be split to the same length. Properly prepared and sterilized, the tendon furnishes, however, an excellent suturing material. The walrus (*Trichechus rosmarus*) is an immense marine mammal, which weighs, on an average, one ton, and is an inhabitant of the Arctic regions. A few pounds of powder or a few sides of bacon would purchase from the natives enough tendon material to supply one of the largest hospitals for a year.

Whale tendon I obtained at a whaling-station on the coast of Labrador, where its commercial value is almost *nil*. The sperm-whale and the baleen or whalebone whales (*Mysticete*) have become quite rare, even on the coasts of Labrador and Greenland, as the aggressive work of the whalers has driven them to more inaccessible regions. The day before we called at this whaling-station, three of these sea monsters were brought in. I was given a large slab of tendon tissue from the back, and I dried it in the rigging of the ship. The Sisters at St. Joseph's Hospital found it impossible to split it in finer threads than those of the coarsest of kangaroo tendons. I have made quite an extensive trial with these coarse sutures, properly iodized, in operations for the radical cure of hernia, with the most satisfactory immediate and remote results. After a somewhat extensive experience with the tendons of these sea animals as a suture and ligature material, I would accord those of the narwhal the first, of the walrus the second, and of the whale the last place. I am satisfied that the tendon tissue of these sea animals of the Arctic regions is far superior to the tendon tissue of land animals, from anatomic and bacteriologic standpoints, and hope that it will receive from the profession the attention to which it is entitled by its intrinsic qualities.

Finally, I am convinced that from a commercial, scientific, and practical point of view, tendon tissue is destined to take the place of catgut in the armamentarium of the surgeon, and in the operating-room of hospitals, both in military and civil practice.

VACCINE THERAPY AND PASSIVE HYPERÆMIA IN SURGERY

The Necessity of Combining Vaccine Therapy and Passive Hyperæmia with General Surgical Treatment of Infections

By JOHN C. HOLLISTER, M. D., Chicago
Adjunct Surgeon, St. Luke's Hospital

IN order to secure the best results in general surgical work to-day, one must combine: 1. The most approved methods of surgical technique with 2. Vaccine therapy, such as has been of late made practical by the work of A. E. Wright of London, and 3. The working methods of hyperæmia, as have been so strongly advocated by Bier of Bonn and many others. In other words, in order to do the most good in the shortest time for the patient, the general surgeon must use one, or a combination of two or of *all*, of these different lines of treatment, depending upon the nature and stage of the affection.

This statement represents the firm conviction of Dr. L. L. McArthur and myself, and is based upon the following facts:

1. The whole modern trend of the therapy of infection is towards immunization or helping the organism to resist and overcome bacterial insult by strengthening and adding to the so-called anti-bodies. This is evident to all, and need not be discussed, except to say, that, when we consider the fact, so often neglected, namely, that the surgeon can in *absolutely no case of injection* remove the whole of the irritant (unless possibly within the instant of time after the original insult), and that it is *only* due to the fact that the organism is able by mechanical and chemicophysiological means to meet, combat, and throw off this irritant, that the restoration to health is possible; then it is that we see the necessity of adding to the sum total power of resistance by helping this body to have *more mechanical* and *more chemicophysiological* resistance. One cannot but think after reading Bier's book on hyperæmia as a therapeutic agent, and his reports of cases, and then studying Wright's work, that the former represents the mechanical and the latter a certain part of the physicochemical factors, and that possibly the value of the former really depends upon the fact that Bier's methods intensify localization of these physicochemical resisting elements by flooding areas otherwise barren in these elements.

2. Wright has developed to a definite practical working basis the use of "vaccines" for tubercular, staphylococcic, and streptococcic (and we shall probably soon be able to say gonococcic) infections. He has developed a clean-cut laboratory technique whereby one can in most cases not only diagnose the individual infection but can accurately judge the effect on the patient of the vaccine given from dose to dose. By so doing he has been able to accomplish results of which you have all read and heard.

3. We have earned a favorable outlook in this opsonic work by our own experiments. Just how far we are as yet justified in announcing actual favorable results will appear in the discussion of cases reported.

4. The results reported by Bier and many others throughout Germany, especially at the surgical congress in Berlin last spring, from the use of active and passive hyperæmia, especially in the so-called surgical infections, are good.

5. Our own results in a number of selected cases treated by passive hyperæmia have been, as a rule, excellent.

Presentation of cases and discussion of the whole hyperæmia question will be reserved until a later time.

It is my purpose, after having made the above statements, to —

1. Describe Wright's working technique for estimating the opsonic index in normal and pathological blood and his vaccine therapy in general.

2. Exhibit the beginnings Dr. McArthur and myself have made in our laboratory at St. Luke's Hospital during the last six weeks.

A few words, first, about the theory of resisting bodies and opsonins. There are four main resisting powers of the blood which act against

Fig. 24. Field of leucocytes as it appears under low power.

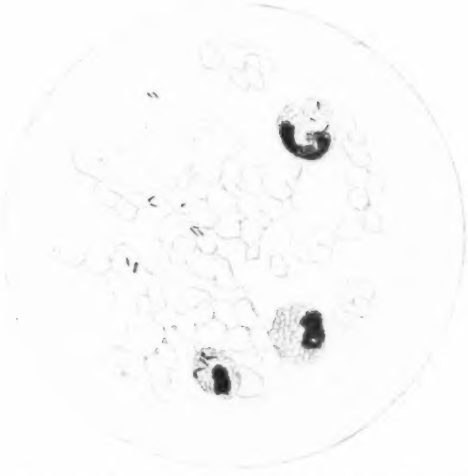


Fig. 25. Leucocytes containing tubercle bacilli under oil immersion.

Fig. 26. Field under oil immersion, showing staphylococci in leucocytes.

bacteria and their toxins: 1. Bacteriocidal; 2. Bacteriolytic; 3. Agglutinating; and 4. Phagocytic.

There is *no* bacteriocidal, bacteriolytic, or agglutinating action of blood on streptococci, staphylococci, and pneumoccoci.

There is *some* agglutinating power of the blood on tubercle bacilli, but *no* bateriocidal or bacteriolytic.

Therefore, phagocytosis is the only resisting power the blood has to these infective agents (except the tubercle bacilli, as above).

Therefore the dosage of the vaccines cannot be measured, except by means of the opsonic index.

The word "opsonin" (Latin, *opsono*, I cook for table; I prepare pabulum for) is a name given by Wright to certain bacteriotropic substances in the blood which have a specific action upon bacteria in so influencing them as to render them subject to phagocytosis. He says: "There exists in normal blood, and there exists in larger quantity in the serum of the successfully inoculated patient, an element which enters into chemical combination with the staphylococcus, the tubercle bacillus, or other micro-organism in such a manner as to prepare it for phagocytosis. We have demonstrated that phagocytosis cannot take place, apart from the action exerted by the specific opsonin upon the micro-organism."

Determination of the opsonic power of the patient's serum as compared with the opsonic power of a normal individual (i. e., the *opsonic index*) Wright has ingeniously made possible by comparatively simple methods. The object of his vaccine treatment is to raise the opsonic index of the patient, which is low or very variable, to a point as high as or higher than that of the normal individual. A *vaccine* is any chemical substance which when introduced into an organism causes an elaboration of protective substances. A bacterial vaccine is always a derivative of the bacterial protoplasm. Now, Wright has found that by administering specific bacterial vaccines one can raise this opsonic power of the patient, and that every day the patient's opsonic index is high is a day of gain for the patient.

For a concrete example, consider the following:

A case of suspected tubercular infection.

If this patient's tuberculo-opsonic index is consistently below that of a normal individual, he *has* tuberculosis. If much higher or very variable, he also probably has tuberculosis.

His opsonic power and that of a normal individual can be accurately determined and compared.

His tuberculo-opsonic index can be *raised* and *maintained*, if he *is* infected, by the proper dose of the proper vaccine, and when raised and maintained his tendency is towards recovery.

The proper dose can be accurately determined for each individual, and it is just here that Wright has gone beyond all others, for he has established methods of estimating the effect of the dose given. Therefore it is now possible to avoid too high dosage — to which may be attributed the frequent poor or dangerous results following the use of tuberculin as heretofore given.

To put it most conservatively, then, we have a method which is of tremendous worth: 1. In determining an accurate diagnosis; 2. In administering a scientifically rational therapy, by 3. Accurate regulation of dosage.

Now as to the technique.

In considering this we will endeavor to make plain the theoretical conceptions above.

We may divide the whole into six headings.

1. Washed white blood-corpuscles ("cream").
2. Emulsion of bacteria.
3. Patient's blood-serum.
4. Normal blood-serum (or "pool").
5. Implements — Incubator, pipettes, capsules, etc.
6. Vaccine therapy.

(No. 5 will be elaborated as we proceed through the steps of the other headings.)

In order to think of these things really pertaining to the body, and to try and prevent ourselves from considering them simply as products of the test-tube and incubator, I ask your attention to a rough diagram. (Fig. 1.)

Into the tissue (AB) has entered a pathogenic organism represented by the short line, 1. Let SS represent the bathing blood-serum, and the figure to the left a phagocyte.

The theory of the whole opsonic idea is this:

1. Before entrance of the bacterium into this tissue, there are already present opsonins in the serum (SS).

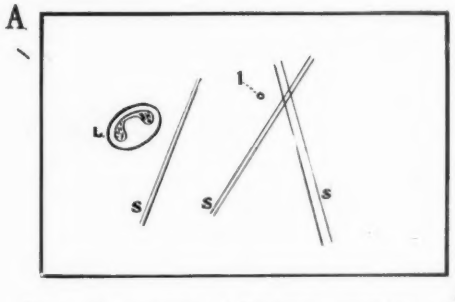


Fig. 1. L. Leucocyte. O. Pathogenic organism. S, S, S. Bathing serum.

2. When the bacterium enters this tissue, these opsonins, if they are sufficient in strength and quantity to "satisfy" the germ, so act upon this germ (we do not know how) that the germ is taken up by the leucocyte, and it is only due to this action of the opsonins upon the germ that phagocytosis takes place.

3. If the leucocyte's food (the invading germ) has been opsonically prepared, it is destroyed.

4. Further, the invasion of the germ and its toxins brings about at least two actions that have a bearing here.

(*a*) The number of leucocytes is increased (chemotaxis).

(*b*) The serum is stimulated (or possibly the white blood or connective tissue cells themselves) so that there occurs in this serum a larger number or amount of opsonins. (We do not know how.)

The specific opsonins of an infected patient are low if that patient is not getting better.

Therefore we see that the more opsonic power there is present to act upon the germ, or myriads of germs, so that they will become subject to the ingestive action of the leucocytes, the more surely the irritating organism will be destroyed. *Increasing the leucocytes is not sufficient.* If we could add by artificial means to this tissue more opsonins, we could assist the combined action of the opsonins and leucocytes to the detriment of the germ.

We can do this, because we now know that not only the presence of *living* pathogenic organisms will bring about an elaboration of opsonins, but also that an emulsion of *sterilized* organisms will induce this same elaboration of opsonins. We cause to be elaborated by injection of a specific vaccine a larger supply of opsonins which will be carried by the serum of the general circulation to the locality where the germs rest.

To return to the technique: The first four headings represent "live materials," and the whole object is to compare the results obtained from a combination of 1, 2, and 3 with 1, 2, and 4 under similar conditions. We wish to determine how many bacteria will be ingested by white blood-cells when these bacteria have been acted upon by the opsonic substances in the patient's serum, and to compare this number with the number obtained when we use the *same* white blood-cells — the *same* emulsion of bacteria, but combined with the serum from

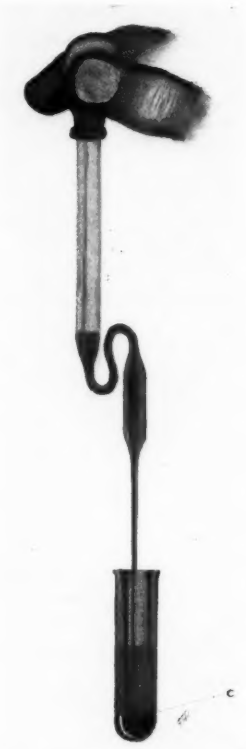


Fig. 2. Aspirating off the supernatant salt solution from the precipitated blood-corpuscles by means of a curly pipette. Note the grayish coating of washed leucocytes on top of the mass of red cells. This is the cream (C). Compare with Fig. 13.

normal blood — all, of course, under the *same* conditions of time and temperature.

We prepare the "cream" or washed white blood-cells as follows: Ten or fifteen drops of blood from the finger of any person having healthy-looking leucocytes (not granular or seedy) are dropped into a small centrifuge-tube filled three fourths full with a solution of sodium citrate (1.5 per cent in 0.85 per cent salt solution) to prevent coagulation by throwing out of solution the calcium salts. The tube is carefully inverted upon the thumb after every two or three drops, so as to mix the blood thoroughly with the solution.

This is then centrifuged five minutes and the supernatant fluid aspirated by means of a curly pipette.

Salt solution (0.85 per cent) is then run into the tube, the corpuscles throughly mixed as before, centrifuged, and the clear fluid again removed. The leucocytes are thus washed free of serum, and hence of the opsonins present in the serum. The centrifuge throws the red blood-corpuscles to the bottom of the tube, and leaves the leucocytes, which are lighter and larger, on top as a grayish film. This upper layer is known as the "cream." (Fig. 2.)

Notes

May use animal blood.

Cream should be made fresh each time it is used, to avoid contamination.

The centrifuge should be exactly balanced, should revolve for about five minutes, and be stopped gradually, to obtain most accurate clean-cut layers of corpuscles. Centrifuging the blood longer than five or ten minutes may break up the leucocytes.

II. EMULSION OF BACTERIA

A. Tubercular Emulsion

Obtain on the market (P. D. & Co.) residue from the manufacture of Koch's old tuberculin (tubercle bacilli and glycerin).

1. Wash a little in test-tube with 0.85 per cent salt solution to get rid of glycerin.
2. Filter by ordinary filter-paper.
3. Place dry residue (powder) in agate mortar and grind up with 1.5 per cent salt solution to get milky emulsion. (At times necessary to grind one half to one hour to break up clumps thoroughly.)

Fig. 3. Churning emulsion of bacteria by means of fine short capillary pipette. This is done to break up clumps.

4. Draw up into short pipette and centrifuge to throw down remaining clumps.
5. Dilute supernatant fluid to required strength.
6. This emulsion can be kept in stock, but must be shaken throughly and centrifuged for about one minute just before being used.

B. Other Emulsions

1. Small amount of salt solution (0.85 per cent; see below) is run into tube containing slant agar culture of bacteria, and the latter are scraped off by wire loop or glass pipette.
2. Remove by pipette and place in a watch-glass containing small amount of salt solution.
3. Dilute to required strength and churn up and down through a pipette of very fine caliber (Fig. 3) to break up the clumps. Centrifuge also if clumps persist.

Notes on Emulsions

1. *Clumps.* Especially apt to have clumps when working with —

Staphylococcus aureus.
Streptococcus.
Tubercle bacillus.

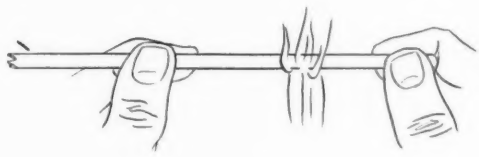


Fig. 4. Making the capsule. First step. Heating the tubing over blowpipe.

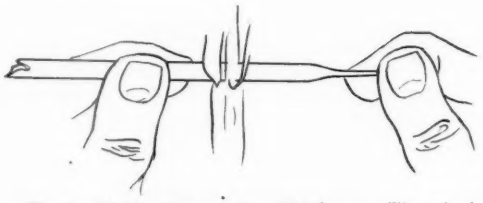


Fig. 6. Making the capsule. Third step. The tube is again melted about 1½ inches to the left.

Therefore much churning and centrifuging is necessary.

2. *Density.*

Malta fever emulsion should be "very thin."

Streptococcus emulsion should be "thin."

Staphylococcus emulsion should be "thicker."

Tubercle emulsion should be "thicker still."

In order to obtain exactly the right thickness to the emulsion, it is often necessary to incubate, stain, and examine a preliminary specimen.

Should have 2 to 10 organisms per leucocyte in case of staphylococcus; 1 to 2 in case of tubercle; and should have about 2 in case of streptococcus, but in the last, one finds the count runs more irregularly (i. e., 0, 9, 0, 0, 1, 0, 0, 0, 0, 7, 0, 2, 0, 10, 0, 6, 0, 0, 0, 3, 4, etc.).

3. *Permanance.* Emulsion will keep corresponding to the ease with which the bacterium resists solution; i. e., a resisting organism like tubercle bacillus will last for years. It is necessary to have clean-cut organisms.

Practically —

Tubercle bacillus may be any age.

Streptococcus up to a week.

Staphylococcus two days only.

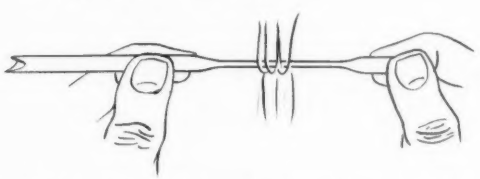


Fig. 5. Making the capsule. Second step. Tube is drawn out three or four inches, and, after melting through, the small end in the right hand is thrown aside. At the instant of melting through, if the hands are drawn widely apart quickly, there will result a very fine point to the capillary end of the tubing in the left hand.

Bacillus coli must be used within twelve hours.

Gonococcus must be used *at once* (get all other things ready and watch growth carefully).

Malta fever within a few hours.

Pneumococcus can be used after several days.

4. *The Salt Solutions.* Use an 0.85-per-cent solution in all but —

Tubercle bacillus.

Gonococcus.

Neoformens.

In these three one gets a certain amount of phagocytosis if no serum is present. One must therefore use the percentage of salt solution that gives the least amount of phagocytosis, which, practically, is 1.5 per cent.

III. THE NORMAL SERUM, OR "POOL"

Ten to twenty drops of blood from each of several normal individuals are collected by means of "capsules" made from glass tubing, of about 6 mm. in diameter, as shown in the following illustrations. (Figs. 4 to 9, inclusive.)

The point of this capsule may be used as a convenient "stabber." (The interior of capsule is easily made absolutely sterile by heat

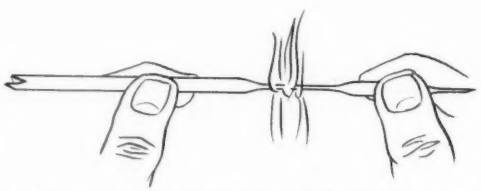


Fig. 7. Making the capsule. Fourth step. A second capillary interval, five or six inches long, is made.

while being made, if so desired.) Fig. 10 shows the method of securing the blood by means of the capsule.

The straight end of the capsule is then sealed by lamp or match, protecting the serum from heat by the fingers, as seen in Fig. 11.

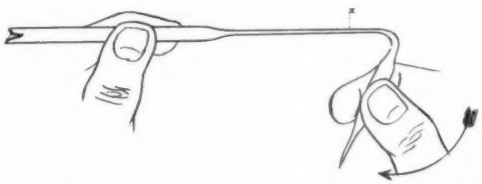


Fig. 8. Making the capsule. Final step. Away from the flame, the capillary end is bent to somewhat more than a right angle. Then the capsule is freed by melting through the fine tube about the point marked *x*.

The blood is then thrown from the curved portion of the capsule into its straight end by holding firmly between the thumb and finger and making a strong flip of the hand.

After allowing the blood to clot by standing, or, more quickly, in incubator (compare Fig. 18), the capsule is centrifuged, the curved end being hooked over the centrifuge-tube, and when ready to use, its top is broken off (conveniently by pliers) so that the pipette can easily be run down into the serum.

Fig. 12 shows the serum ready to be drawn off by the pipette.

The sera from the several normal individuals are then collected in a single pipette by drawing out one half or one third at a time from each, repeating in order to mix throughly. About the same total amount is taken from each capsule. This mixed serum is called the "pool."

Notes

In the case of tubercle bacillus, gonococcus, and neoformens, the sera of only one or two individuals are necessary, but the opsonic index of man varies more to staphylococcus and especially to bacillus coli. It is therefore necessary to use, in the case of staphylococcus and streptococcus, the sera from four or five individuals, and from ten to twelve in case of bacillus coli.

One finds large differences between the patient and pool in bacillus coli in contrast to tubercle bacillus. In the latter the opsonic

Fig. 9. The completed capsule. Note the fine stabbing-point at the straight end, *x*.

Fig. 10. Obtaining the blood by means of the capsule, both tips of which have been broken off. *Note:* 1. Bandage wound tightly about fingers of patient. 2. Most favorable place for obtaining a good flow of blood (it is necessary to make but one stab with the fine point of the capsule before breaking). 3. Relatively lower position of capsule to obtain greater capillary action.

index rarely amounts to more than twice or is less than one half that of the pool.

Pool must be used within twenty-four hours, and must be kept out of the sunlight.

IV. THE PATIENT'S SERUM

The patient's serum is collected in a capsule in exactly the same way as that of the individuals "making up" the pool. This capsule, though, is labeled with a blue pencil with number or name.

Notes

The serum should be tested within twenty-four hours, if possible; but if kept sealed and in a dark place, it loses but little of its opsonic power within three days. The sealed capsule containing the serum may often be made ready by the patient himself and mailed, properly labeled, to the laboratory.

Great care is to be exercised not to get antiseptics of any kind in the sera or solutions throughout the tests.

Having prepared the necessary materials, we proceed as follows:

The cream, pool, emulsion, and patient's serum (or sera, if several, as is usually the case) are conveniently "stood up" in a row in a shallow dish containing wet sand covered with filter-paper. (Fig. 13.)

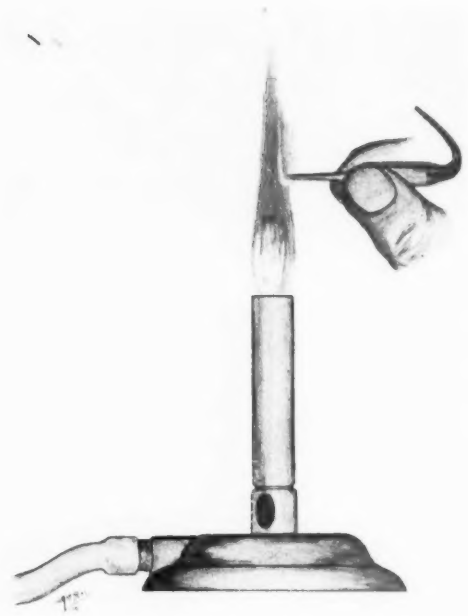


Fig. 11. Sealing off straight end of capsule. Note that fingers are held nearer to flame than is the blood in the capsule. This is to prevent heating the blood, which would destroy the opsonins in the serum.

Pipettes are made from tubing about 6 mm. in diameter which fits closely the holes in the incubator A piece of tubing 5 cm. long is heated in the middle and drawn out to capillary size, and when cool is broken or cut in its center to make two pipettes each having its capillary portion about 9 cm. long and 0.5 mm. in diameter. This is best shown by diagrams. (See Figs. 14, 15, 16.)

Considerable practice is necessary to obtain pipettes of even caliber throughout their length. This is best accomplished by heating the center of the tubing throughly, drawing it out (away from the flame) until the desired diameter is reached, stopping an instant to let it cool slightly, and then drawing it out to its full required length. This momentary pause during the drawing out of the tubing fixes the size obtained in the center, and the greater length is obtained by drawing out the still hot but larger portion of the tubing.

To proceed. Several pipettes of practically the same caliber are selected, and a "volume" is marked off with a blue pencil, about 15 mm. from the capillary end of each.

Into a pipette upon the large end of which a rubber teat is fitted is then drawn a "volume" of cream, then allowing a "space" of air to enter between, a like volume of emulsion, and then, after another separating "space" of air, a like volume of patient's serum. (See Fig. 13.)

These three volumes are forced out upon a clean slide, where they are mixed by working the fluid out of and into the pipette five or six times. (Fig. 17.) Mixed bubbles of air may be avoided by having end of pipette clean-cut with even point and by applying this end to slide at right angles during the mixing.

The mixed fluid is then drawn up into the center of the pipette's capillary end and the tip is sealed in the flame. The pipette (Fig. 18) is at once labeled with a number corresponding to that of the individual patient, placed in the incubator, and the exact time noted.

A similar pipette, prepared in the same way, but containing a volume of normal serum from the "pool" in place of the patient's serum, is placed alongside of the first in the incubator, and its exact entrance time noted.

Fig. 19 shows the admirably adapted incubator designed by Dr. J. C. Freeman, one of Wright's co-workers. This incubator is in constant use in their laboratory. The small metal tubes which admit the pipettes are surrounded by water, which is kept at a constant temperature (between 37° and 41° C., as desired) by means of a thermostat introduced above.

(If there are a large number of patients' sera to be examined, more than one "pool" is put in; one "pool" after the fourth or fifth

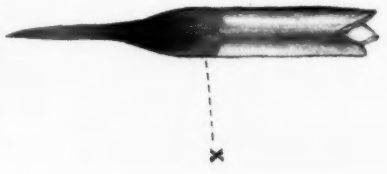


Fig. 12. The capsule sealed at the bottom and broken off at the top. The clot is precipitated by centrifuging, leaving the clear serum above (X).

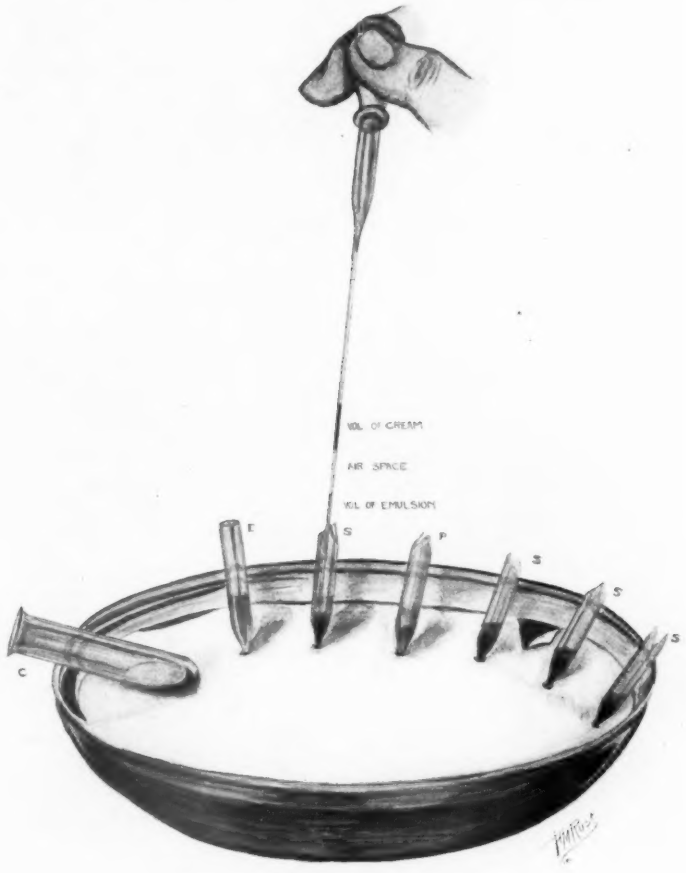


Fig. 13. Shallow dish containing wet sand covered with filter-paper. A convenient device for holding upright the different capsules, etc. C. Cream. E. Emulsion. P. Pool. S, S, S, S. Patient's sera. Into the pipette has already been drawn a volume of cream and a volume of emulsion, separated by a space of air. A volume of serum is now being added.

patient's serum, and another after the eighth or ninth.)

After a definite time for incubation (usually fifteen minutes), the first pipette is withdrawn, its end broken off, and its contents blown by the mouth upon a clean slide, and thoroughly mixed by carefully sucking up and blowing out several times. (Fig. 20.) Then a drop is transferred to one end of a special slide that has been previously prepared by grinding its surface with fine emery-paper. (Fig. 21.) This is done so that the smear or "film" to be now made will be evenly distributed on its surface.

The film is immediately made by first distributing across the slide and then drawing by quick motion the drop (by means of a smooth end edge of another slide) across the surface of the ground-glass slide. (Fig. 22.)

A satisfactory film will appear somewhat as is illustrated in Fig. 23, having most of the leucocytes at the edges of the "tongue."

Similar films from the other incubated pipettes are then made, and each slide is labeled

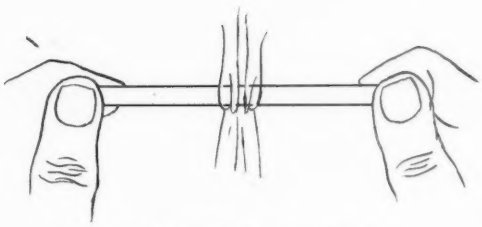


Fig. 14. Making the pipette. First step.

with the individual's number to avoid confusion.

The films are then stained.

Fig. 15. Making the pipette. Second step. The heated tube is drawn out, away from the flame, and broken in the center.

Fig. 16. The finished pipette, with rubber teat applied and a volume marked off by blue pencil (x).

The Leischman stain is used for all, except in case of Malta fever and tubercle (carbol-

Fig. 17. Mixing upon a clean slide the equal volumes of "cream," emulsion, and serum before incubation.

thionir for the former and carbolfuchsin for the latter).

The Leischman stain is a chemical com-

Fig. 18. Pipette ready for incubator. *Note:* 1. Relative location of contained mixed fluid, F, F. 2. Sealed tip. 3. Labeling number for identification, made conveniently with blue pencil (x).

bination of eosin and methylene blue, and is made as follows:

One quarter gram of the dry powder is ground up very thoroughly with 100 c.c. of *absolutely pure* methyl alcohol. A small amount is used to immerse the film, and after one minute distilled water is added, and the whole carefully mixed. (The first step fixes the film and the second stains it.) After two minutes the slide is washed, dried between filter-paper, and is ready to be examined.

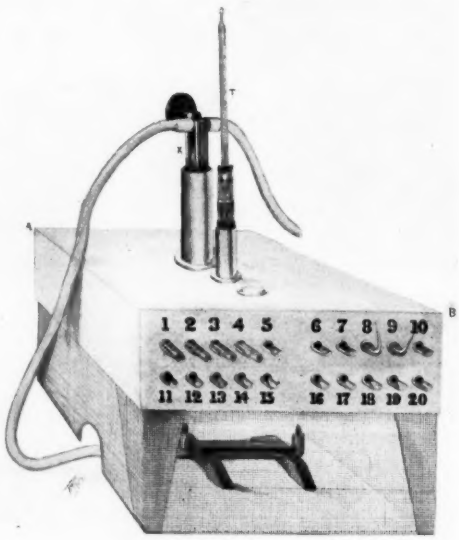


Fig. 19. Opsonic incubator designed by Dr. J. C. Freeman of Wright's laboratory. A, B. Metal chamber containing water, through which are inserted metal tubes for the reception of the pipettes for incubation. Nos. 1 to 4 contain these pipettes. Nos. 8 and 9 contain capsules of patient's blood (to hasten clotting). X. Thermostat regulating temperature (37° to 41° C.). T. Thermometer. (Note height of water in glass tube about thermometer.)

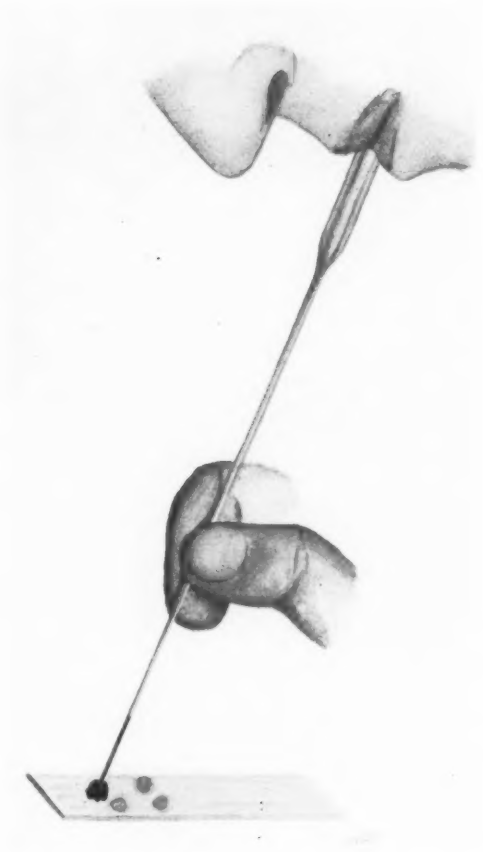


Fig. 20. Final mixing of "cream" emulsion and serum after incubation upon a clean slide.

A "good field," i.e., one that contains a large number of leucocytes (best found along the edge of the tongue), is first picked out by the low power. Then, under the oil immersion the first fifty or hundred polymorphonuclear neutrophiles that come into view are noted, and the number of bacteria found in each is marked down. The average number of bacteria per leucocyte is the *phagocytic index*. This is noted for each serum examined.

Calling the phagocytic index of the pool *one*, or normal, we compare it with the phagocytic index of the patient and obtain his *opsonic index* as greater or less than, or the same as, the pool.

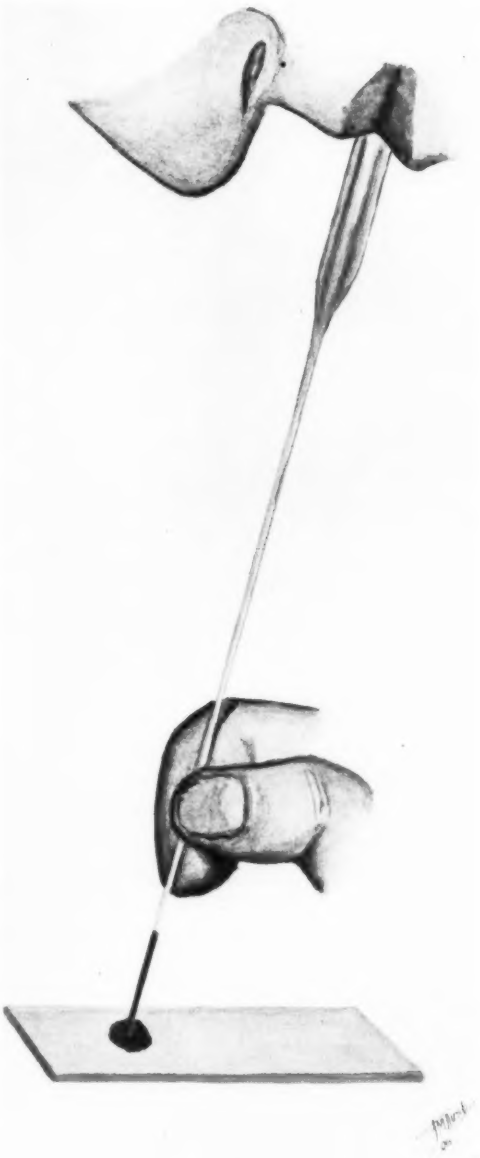


Fig. 21. The drop to be drawn out into a film is placed on a slide the surface of which has been ground with fine emery-paper.

Fig. 22. The drop upon the ground slide (X) being extended across the slide by a second slide, the edge of which is found to be smooth and even, the upper slide, held by the fingers, is then drawn quickly across the ground slide, thus spreading the drop out thin.

Figs. 24, 25, and 26 show staphylococci and tubercle bacilli in the leucocytes.

The tubercle films are stained as follows:

1. Fix film in saturated bichloride of mercury solution (seven per cent) one minute.
2. Stain with carbolfuchsin, heating just to a steam. Do not leave on more than one minute, or it will disintegrate the cells.
3. Wash in tap-water.
4. Wash till faintly pink, in 2.5 per cent sulphuric acid.
5. Wash with water.
6. Wash quickly till film fades in five-per-cent acetic acid, to destroy the red blood-cells (not entirely, for traces help to find the leucocytes).
7. Wash thoroughly in tap-water.
8. Counterstain in methylene blue made in the following manner:

Methylene blue, ½%. Practically ½ gram.
Sodium carbonate, ½%. Practically ½ gram.
Distilled water, 99%. Practically 100 grams.

(The sodium carbonate removes any acid that may be present, and faintly stains the protoplasm of the white cells. Only the nuclei are stained if this is not used.)

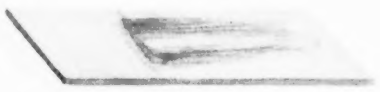


Fig. 23. Film ready for staining. The leucocytes will be found in the greatest numbers along the edge and central line of the tongue.

As to the length of time for incubation, it may be said the pipettes are usually kept in as long as the organism will stand it. Must have well-defined organism when removed.

Staphylococcus, streptococcus, pneumococcus, and tubercle bacillus can be kept an hour — usually fifteen minutes; coliform organisms not more than ten minutes; gonococcus not more than seven minutes. If only seven minutes, then make the emulsion fairly thick, except the coliform, which are easily picked out.

VACCINE THERAPY

The method of making the tubercle vaccine will first be described and then the vaccines of the other organisms.

A. Tubercle Vaccine

1. Procure a bottle of Koch's new tuberculin. One c.c. of this fluid contains 10 mg. of dried, weighed, ground-up tubercle bacilli.
2. Draw up into a sterilized curly pipette the contents of the bottle. Seal end of pipette.
3. Wash the bottle with exactly 1 c.c. sterile normal salt solution, and draw this up into a second pipette, which is also sealed in the flame.
4. Place both curly pipettes in water at 60° C. for one hour, to be sure that the tuberculin is sterile.
5. A vaccine-bottle (see Fig. 27) is made ready. This is of brown glass, and contains 50 c.c. of normal salt solution. It is lysolized by adding ¼ per cent (1.25 cmm.) lysol and covered with rubber cap.
6. By means of a syringe, 2 c.c. of the contents of this bottle are removed by dipping the rubber cap in lysol and plunging the sterile needle through the cap into the fluid.
7. The end of each of the curly pipettes containing the sterile tuberculin is then drawn out to a fine capillary point. This is broken off aseptically, and the contents of each tube is expelled into the vaccine-bottle by plunging the fine end through the lysolized rubber cap. Wash out each tube carefully by drawing up and expelling several times a little of the fluid of the vaccine-bottle.
8. Make cultures from the vaccine for control.

We have therefore prepared a bottle of sterile vaccine, each cubic centimeter containing $\frac{1}{5}$ mg. of tubercle bacilli. Tubercle vaccine is always measured by weight, in contrast to the others.

This is stock concentrated solution. (Fig. 27.)

To dilute to desired strength for use we draw off $\frac{1}{2}$ c.c. from the stock-bottle and inject it into a similar bottle of lysolized salt solution. Here, therefore, we have a one hundred fold dilution, and therefore 1 c.c. equals 1-500 mg.

The standard dose for the tubercle vaccine is 1-1000 mg., and is therefore $\frac{1}{2}$ c.c. (1-10000 mg. is minimum and 1-600 mg. is maximum dose).

As a general rule, we give a larger number of small doses in general infections and larger doses in localized infections.

Injections are best made with a syringe having a transparent barrel and regulating threaded nut running upon the graded shaft of the plunger. Needles should be somewhat larger than the ordinary hypodermic needle. Injections are best made where there is considerable fat and subcutaneous tissue (i.e., abdominal flanks, between scapulæ, etc.).

Sterilization of the syringe and needle is conveniently, quickly, and absolutely *thoroughly* done by dipping the attached needle deeply into olive-oil heated to 130° C. and drawing up a barrelful of the hot oil two or three times. The skin is conveniently sterilized at the point of injection by touching with the wet cork of the lysol-bottle. After the injection, this area is wiped with a little alcohol to prevent a possible irritation.

B. Vaccines of Other Organisms

1. Grow a thick culture of desired organism upon agar slant (or most suitable medium).

2. Pour over the growth a small amount of salt solution and scrape off the growth into it by means of platinum loop or glass rod. It is necessary to make this emulsion thick, if it is to be used for stock solution. It is often necessary to use several tubes, pouring contents of one into a second tube and then into a third, etc. (In case of staphylococcus, it is best to have abundant growth, and this is conveniently obtained by having the agar slant in flat-sided medicine or whisky flasks.)

3. Decant the emulsion into a test-tube or flask, and seal.

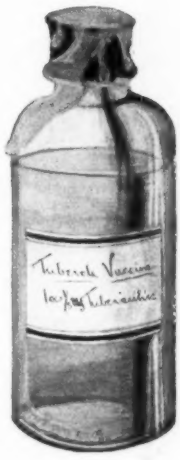


Fig. 27. Stock-bottle of tubercle vaccine. Note the rubber cap, which is kept coated with paraffin, as a further precaution against contamination.

4. Shake up thoroughly, to break up clumps.

5. Withdraw a small amount, and count the number of organisms in the emulsion by comparing with red blood-cells (method given below), and label the bottle according to the number of bacteria there are in each cubic centimeter.

6. Reseal, and sterilize at a temperature and for the length of time just sufficient to kill — just as little as possible. The average equals 30 minutes at 60° C.; aureus a little longer;

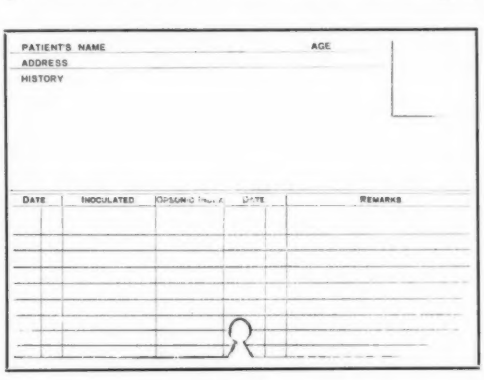


Fig. 28.

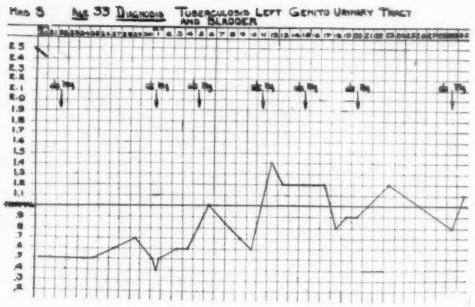


Fig. 29. Mrs. S. Age 33. Tuberculosis of left kidney and ureter — nephrectomy, ureterectomy. Vesicovaginal fistula, right pyelitis — nephrotomy. Finally, drainage of right ureter through right loin. Each of these operations had an interval of rest and recovery of a year to a year and a half. Extremely critical condition when injections were begun.

coliform a little shorter; gonococcus 15 minutes at 58° (Leischman).

7. Plant out to see if sterile.

8. Put in tube enough lysol to bring it up to $\frac{1}{4}$ per cent (for preservation).

Special Notes

Staphylococcus. One can make bullion cultures. When it is thick, pour a little broth over large agar slant surfaces and then stand bottles upright. Next morning a thick growth is found over the whole surface. The therapeutic action of a vaccine made from each of the different kinds of staphylococci is probably the same, and one can here have a stock-bottle.

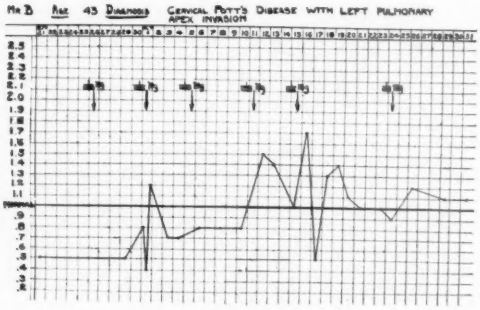


Fig. 30. Mr. B. Age 43. Emaciated adult. Weight, 87 pounds. Cervical Pott's disease, with spinal pressure symptoms and with left pulmonary apex invasion.

Streptococcus. In dealing with streptococci, it is necessary to make the vaccine from a growth of the specific organism in the individual case. This is because the different strains of streptococci elaborate different opsonic antibodies. It is not yet established that each variety causes a definite line of symptoms, and we cannot yet tell what variety is causing the disease, unless cultures are made. (This is in contrast to staphylococcus, gonococcus, and tubercle bacillus emulsions, which may be made in bulk.)

Pneumococcus. Probably all cases of straight pneumonia are caused by the same organism.

Dosage. The dose varies with the length of time the patient goes without the injection.

Staphylococcus. Average is five hundred million; maximum, two thousand million; minimum, ten million.

Streptococcus and Pneumococcus. Average is fifty million; maximum, two hundred million; minimum, four million.

Gonococcus. Average is ten million to twenty million; maximum, two hundred million; minimum, two million.

Bacillus Coli. Here one must be very cautious. It is unsafe, because of the marked reaction, to give more than one hundred million to two hundred million, starting with fifty million.

The following is a method for estimating number of organisms per cubic centimeter of the emulsion, taken from Wright's book on antityphoid inoculation:

Draw up in a pipette one volume of blood (from finger), then a volume of vaccine, and then three volumes of physiological salt solution, or, in lieu of these last, as may be required, one, two, or three further volumes of the vaccine, taking care in each case to complete to five volumes. Make and stain a film in the same way as described above. The bacteria and red blood-cells are now separately enumerated on a series of fields chosen at random from different parts of the film. These results are entered into the following proportion:

Number of red blood-cells in average field : number of bacilli in average field :: number of red blood-cells in a unit of volume (i. e., 4,500,000 per c.c.) : number of bacilli in the unit of volume.

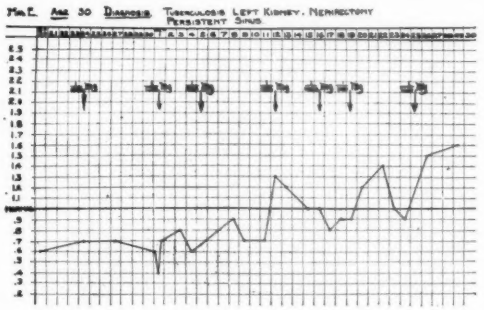


Fig. 31. Mrs. E. Age 30. Tuberculosis left kidney — nephrectomy. Persistent sinus. Sinus has closed, and has remained so to date (three weeks). Increase in general strength and weight.

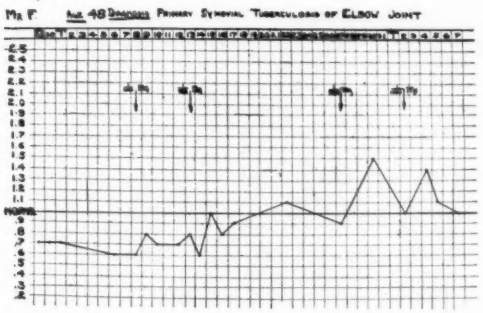


Fig. 32. Mr. F. Adult male. Primary synovial tuberculosis right elbow, requiring arthrectomy. Tenderness and œdema; fistula persisting six months. Since injections have been made, the sinuses have closed over, and the patient expresses himself as very much better. Is able to play the violin "till two in the morning."

What we may expect of the opsonic index after the various injections may be shown by the following remarks:

Tubercle Bacillus. It is to be considered good if we get an index of 2.

Staphylococcus. Up to 3 is good.

Streptococcus and Pneumococcus. May go up to 4.

Gonococcus. May go up to 5.

Bacillus Coli. Up to 8.

Proteus. Up to 14 times, normal.

Fig. 28 shows a convenient card for keeping the opsonic indices on record.

Immediately after an inoculation there is a tendency for the opsonic index to fall below the point at which it was before the injection. This Wright has named the *negative phase.* This fall is followed, in the course of several hours, or possibly within a day or two, by a rise above the point at which it was orginally. This is the *positive phase.* If the dose is best regulated as to size and frequency, it has been demonstrated that it is the tendency for each negative phase to be less, and each positive phase to reach a higher point (within limitations) than the one preceding. We cannot cumulate positive phase upon positive phase indefinitely, for the "immunizing response" is limited, especially in case of tuberculo-opsonic power. It is necessary to make repeated examinations of the blood (every two or three days) to avoid negative phases and maintain the positive phases.

The exact interval of time and size of dose should be decided for each individual patient according to the indices obtained from previous inoculations.

If a negative phase persist, it is best not to wait too long before repeating the dose (three or four days, possibly). The reason why it is not good practice to give the vaccines from time to time without ascertaining the exact opsonic index is because a negative phase may persist for some time before marked clinical symptoms make it evident, and every

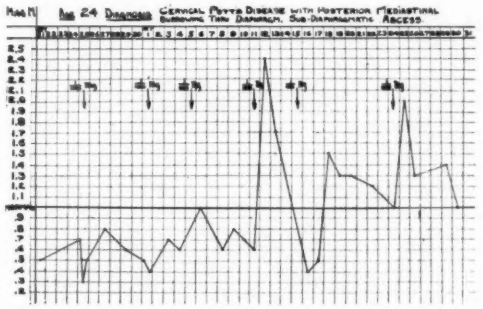


Fig. 33. Miss M. Adult female. Age 24. Cervical Pott's disease; posterior mediastinal abscess burrowing through diaphragm; subdiaphragmatic abscess; drainage of latter, followed in ten days by fæcal fistula; fistula persisting, patient consulted the author; to correct fistula, resection of ileum at ileocæcal region; end-to-side implantation of same in sigmoid. Retroperistalsis made this procedure a failure. Exposure of the hepatic flexure of colon and suture of the bowel perforation successful at second trial. Persistence of fistulous tract through diaphragm. Decided general improvement since injection, as shown by gain in weight and strength. Sinus still discharging, but much less in quantity.

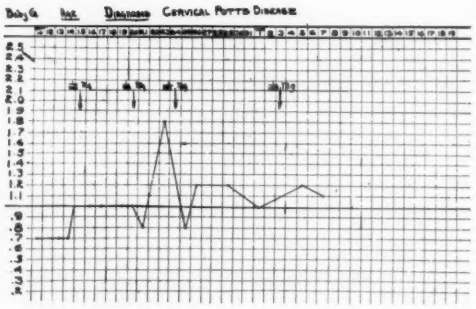


Fig. 34. Baby G. Age 4 years. *Condition October 9, 1906* (when he first came under observation): Patient a thin, emaciated, fretful child, carried by parents because unable to walk. Thighs held flexed, but can be nearly extended passively by using some force. Has a rather sharp kyphosis involving eleventh and twelfth dorsal and first, second, and third lumbar vertebræ. One sinus in the left flank and one in the left groin, both open and discharging thick pus freely. Parents said that he had walked up to within three weeks, and seemed to stop because of general weakness and increasing flexion of the thighs. Patient was sent at once to St. Luke's Hospital, put in bed, with slight traction on the head, and turned over to Dr. Hollister for laboratory treatment. *Condition November 13, 1906:* Patient has gained some five or six pounds, and now looks plump, eats well, and is cheerful, and would be out of bed running around the ward if it were not for the restraint. The sinus in the groin is entirely closed up, and the one in the flank discharges a few drops of serous fluid each day. The flexion contractures of the thigh have entirely disappeared; the patient sits up and turns over in bed with perfect comfort; the muscular spasm and rigidity have disappeared, except in the area affected by the disease. (Dr. J. L. Porter.)

day of negative phase is a day of loss to the patient.

Turning to our own investigations in this work, I wish to call attention to some eight charts upon which have been plotted curves of the opsonic index of the individual patients we have so far treated. Four of the cases are patients of Dr. McArthur. One case has been referred by Dr. J. L. Porter, one by Dr. Love, and two cases are from my service. They are all cases of tubercular infection, and have been receiving tubercular vaccine in the dosage shown. As to the blood-findings in general, we can say that, without exception, we have been able to raise the opsonic index and to maintain it at a much higher average point than it stood before we began. Not only this, but the curves show that, for the most part, the indices are above that of a normal individual. Further, without exception, the cases showed a low index in tuberculo-opsonic power before inoculations were begun. These findings, therefore, tally exactly with what Wright has found to be true. We have used the standard dose in almost every inoculation so far, simply because we have obtained such satisfactory reactions. Negative phases are to be found on the charts after a number of the injections, but not invariably. As compared with Wright's results, we have had few examples of a negative phase following immediately an injection.

Under each chart-curve is a statement of the case. We have as yet cured no individual. That is, of course, impossible within the short time, especially when we consider that the injections have been given to cases which are about as chronic and difficult to cure as any could be.

In general, we can say:

1. With one exception, the patients themselves have considered themselves improving. This one is represented by Fig. 29. Her general condition was critical in the extreme, because of a mixed infection, when the inoculations were begun, as shown by the marked emaciation, decubitus, high temperature, discharging fistulæ, etc.

2. In no case has there occurred evidence of further advancement of the infection.

3. In one case a fistulous tract, open for months, has closed for the first time, and remained closed for about three weeks to date. (Fig. 31.)

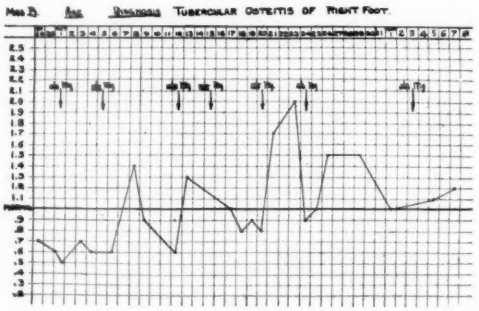


Fig. 35. Miss B. Adult female. Age 30. Tubercular osteitis of tarsal and metatarsal bones of right foot. Resection of diseased bone. Drainage. Healed by granulation. Vaccine injections begun before operation, and continued during the healing of wound.

4. In the case of arthrectomy for tuberculosis of the elbow-joint, with persistent fistulæ, rapid increase in power to use the right arm is noted. (Figs. 29–36.)

5. Improvement in the case of child with cervical Pott's disease is noted below the chart by Dr. Porter. (Fig. 34.)

As final conclusions to this the first part of my article, then, the following are submitted:

The value and necessity of the vaccine therapy to the work of the general surgeon is assured, because:

1. We can diagnose the specific infection by observations of the opsonic index, and this *without administration* of any vaccine whatever.

2. We can raise and maintain this opsonic index to a point as high as or higher than that of the normal individual by the properly sized and the properly interspaced doses of the specific vaccine.

3. When we do so raise and maintain it, we add to the resisting power of the patient's serum, and hence the tendency of the patient is towards recovery.

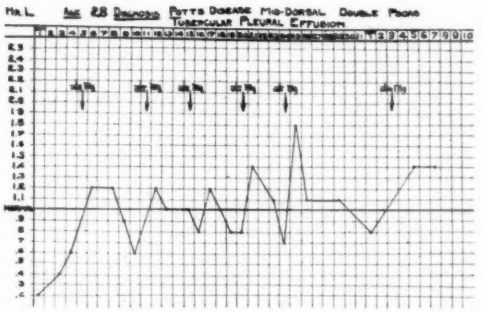


Fig. 36. Mr. L. Adult male. Age 28. Right tuberculous pleurisy, with great effusion; two years' duration before being accurately diagnosed. Tuberculosis of right shoulder-joint. Tuberculosis of mid-dorsal region (Pott's). Double psoas abscess. Abscess opened and drained, improving under injection treatment and general hygienic care.

In conclusion, I wish to acknowledge the marked courtesy shown me by Dr. Wright during the few weeks it was my privilege to work in his laboratory. My thanks, also, are especially due to Dr. J. C. Freeman, one of Dr. Wright's co-workers, under whose instruction I was enabled to acquire the technique. I desire, also, to acknowledge the credit due to Drs. Mary Lincoln and Ruth Vail: the work in our laboratory has been possible only because of their excellent co-operation.

THE BLOODLESS METHODS OF ARTIFICIAL DILATATION OF THE CERVIX UTERI AT FULL TERM[1]

By HENRY F. LEWIS, M. D., Chicago

THE methods of bloodless dilatation of the cervix uteri at term are to be divided into three large groups. The first is the manual method; the second is the method by the introduction into the lower uterine segment or into the cervix of bags to be filled with fluid; the third is the method by metallic dilators. Some might wish to add a fourth method; namely, tamponade of the cervix by means of gauze. This, however, is really not a method of dilatation, except, secondarily, by stimulation of uterine contractions. The dilatation of the os by tents never was extensively employed at full term, but was, in former times, a favorite means of inducing abortion, also of opening the cervical canal to allow of curettage or other uterine operations in gynecology. As a method of accouchement forcé it is hardly to be mentioned.

Early in the seventeenth century, Guillaume and Louise Bourgeouise recommended and practised rapid manual dilatation of the cervix in cases of eclampsia and placenta prævia. Their method (essentially that of Celsus) consisted in forcing the hand in the shape of a cone into the cervical canal and thence into the uterine cavity, where a foot was seized and version performed, followed by rapid extraction. Puzos, in 1727, considered these measures too violent, and recommended gradual dilatation, so as to give the cervical muscular fibers time to become tired out and therefore stretched. He also pointed out that this stimulated the contractions of the uterus, and thereby aided in the dilatation and hastened the delivery.

This use of the hand and fingers as a cone pushed up from below is open to the objection that it is unphysiological, in that it dilates the cervix in the manner reverse to that of nature, namely, the lower portion instead of the upper portion first, and that it pushes upwards against the canal instead of downwards in the direction of the canal, thus again reversing the process of nature. The fingers thus placed in the form of a cone do not feel the force exerted so keenly as when they are pulling down or apart, as in other manual methods.

Twenty-two years ago, Philander Harris perfected his method of manual dilatation. He reported a series of cases to the Pan-American Medical Congress at Washington in 1893. There were nine cases of placenta prævia without maternal mortality. Since then he has had a total of sixty cases of manual dilatation by his peculiar method, done for various conditions and indications, chiefly placenta prævia and eclampsia. The os must first be capable of admitting the finger-tip. The Hegar dilator, or that of Goodell, must sometimes be used first, in order to attain that degree of preliminary dilatation. The average time required to dilate the cervix fully was twenty-three minutes. Harris's method presupposes that the whole hand can be introduced into the vagina. He met three instances where the vaginæ would not admit the whole hand, all primiparæ. His method consists in passing the index finger into the os and then the thumb, then separating the two as in the act of snapping the fingers. Gradually the second finger is passed in to oppose the thumb, then another, until all four fingers and the thumb are through the cervical canal and dilating it to its limit. The fingers become much fatigued, and it is necessary, in a case of any degree of difficulty, to change hands several times. This changing of hands, with the accompanying danger of infection, Harris regards as the worst feature of his manual method. The fingers should exert a tonic stretching, and should not act in jerks. The slight danger of laceration comes after the os has been dilated enough to admit four fingers. In a few instances Harris has lacerated the tissues appreciably. He had twenty cases of placenta prævia, with only one death. If the operator finds the cervical tissues suddenly yielding, he may presume that he has lacerated the cervix.

[1] Read before the Chicago Gynecological Society, September 21, 1906.

Williams is a strong advocate of the manual dilatation by the method of Harris, decidedly preferring it to the metallic dilatation. If the os will not admit even the necessary one finger, he recommends the preliminary use of a metal dilator like that of Goodell. By this method Williams has been able, with one exception, to dilate every case attempted, usually rapidly, often within three or four minutes. The most resistant cervix can be overcome within half an hour, as quickly as with the Bossi instruments. Too rapid dilatation by any means is reprehensible.

Williams reports 87 cases dilated by the Harris method. Of these, 30 were cases of eclampsia, 13 of the toxæmia of pregnancy, 10 of placenta prævia, and 34 for the purpose of hastening labor for various indications. He recognizes three groups of conditions of the cervical canal preceding dilatation by artificial means: 1. The cervix is intact; i. e., neither the external nor internal os is dilated, and the cervical canal remains of usual length; 2. The cervical canal is obliterated, but the external os is not dilated; 3. A still more advanced stage, where the only obstacle to delivery is a portion of the external os remaining undilated.

Seven of the eclamptics died; six of them, however, were moribund on entrance. One case had a deep tear, resulting from efforts at dilating a rigid os. He believes, in this case, Cæsarean section would have been preferable. Williams concludes, in regard to eclampsia, that, if the os will admit one finger or can be dilated that much, the Harris method is safe and justifiable, provided that it can be done slowly. If the cervical tissues are very rigid, he advises Cæsarean section.

In the 87 cases, Williams had three deaths, due directly to the operation; one from infection and two from rupture of the lower segment of the uterus. He cautions against yielding to the temptation of forcing the dilatation when it is more than half accomplished, because at this period there is the greatest danger of lacerations. He agrees with Zangenmeister that powerful metallic dilators, while comparatively harmless in the hands of skilled operators, may be very dangerous in the hands of the general practitioner.

The bimanual method of dilatation of the cervical canal as originally introduced by Edgar, and later revived in Europe by Bonnaire, is a favorite device of many obstetricians. The strongest recommendation for this as well as other manual methods of dilatation is that no instruments are required. The armamentarium is always at the command of any practitioner anywhere. Indeed, every obstetrician must be skilled in some manual method, because he will surely sometimes be in a position where he cannot obtain instruments of any kind, and where his skill with the naked tools of nature may be the only means of saving life or diminishing suffering.

Of late years the school of midwifery at Amsterdam has been the chief exponent, in Europe, of the bimanual method of dilatation. An article by Meurer, appearing in 1903, gives an excellent *résumé* of this phase of the subject. This author considers that the balloon or bag method is too slow, often requiring from one to two hours, and that the Bossi method, while quick, is subject to much danger from lacerations. Bonnaire's method he considers simple and safe. The technique of the method is well described and pictured in Edgar's textbook. First one, then two, then three fingers of each hand are introduced into the cervical canal through the internal os, slightly hooked and pulled apart. At all times the degree of force can be measured by direct feeling of the sensitive and erudite fingers of the operator. As in every method of bloodless dilatation, the danger of lacerations is directly dependent upon the force of the dilator. The strength of the tissues can never be accurately measured, and must be estimated by the feeling of resistance. Such a measure must needs be most accurate when there is nothing between the cervical tissues and the feeling. As the fingers pull the cervical tissues apart they also are pulling downwards and are dragging the lower segment in the same direction. This, of course, is in accord with the physiological scheme of dilatation. A disadvantage is, that, on account of the obstruction afforded by the buttocks and thighs of the patient, the pull must usually be anteroposterior. Thus the greatest strain is put upon the lateral portions of the cervix, the parts most likely to tear.

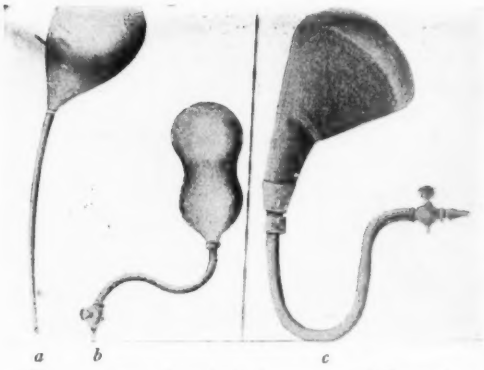


Fig. 1. *a*. Braun's conical colpeurynter. *b*. Barnes bag. *c*. Champetier de Ribes balloon.

Meurer claims that the method is without danger in the hands of experienced persons. He reports 29 cases from the Amsterdam clinic. In 9 of these the method was employed on normal cases experimentally, in 20 for indications. The indications were those usually considered justifiable for quick delivery. Two cases were for prolapsed cord, three for eclampsia, nine for placenta prævia, and the rest for varied indications. There was no harm to the mother in any of these 29 cases. Meulemann, from the same clinic (that of Treub), reports results of 31 cases of placenta prævia, including the foregoing, treated by the Edgar-Bonnaire method. There were two maternal deaths; one from hemorrhage from a laceration in what he calls a rotten cervix, where the fœtus was putrid, and one from sepsis, also where the fœtus was putrid. Four children were born dead, and nine died afterwards in the incubator, mostly premature. In most of these cases version and immediate extraction were done.

The best success with this method has been in cases of placenta prævia. As Edgar points out, one can usually, if confronted by dangerous hemorrhage during the process of dilatation, reach a foot and bring down a half-breech to use as a plug. Even after this has been done, it is still possible to continue the bimanual dilatation, while an assistant holds the projecting fœtal leg out of the way by means of a fillet. Meurer would extend the indications to transverse presentation, cicatricial cervix, and where the dilatation has been unduly prolonged in spite of strong pains.

Other authors have not entirely agreed with Meurer and Edgar as to the entire safety of the operation. Even Kouwer of Amsterdam warns against the too frequent use of the bimanual method. He thinks that it is especially liable to cause tears in placenta prævia. He declares it is not always simple or efficacious. Mendes de Leon also sounds a warning against the too indiscriminate employment of the method by the inexperienced. One must not forget, however, that in all medicine there is no method of doing anything which is entirely safe in the hands of the grossly incompetent or in the hands of the inexperienced. Flines, a Hollander, in writing of quick dilatation by the so-called Bonnaire method in country practice, states that in three cases he had great difficulty with it, twice meeting with no success.

The second great group into which we may divide the methods of bloodless dilatation of the cervix at full term embraces the use of bags or balloons made of some thin fabric and intended to be introduced into or through the cervix and then to be filled with fluid. There are three types of such bags.

The Barnes bag has long been known to the obstetrician. Its principle is direct hydraulic pressure of a fluid within an elastic bag upon the encircling fibers of the musculature. In most hands it has been disappointing. It is not easy to introduce properly, and is very likely to slip out before it has accomplished its purpose. The limited capacity of each size of the series requires that the bag be removed frequently and replaced by another.

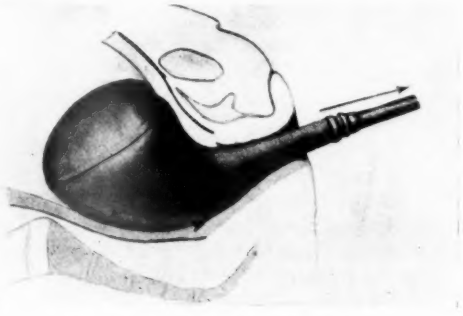


Fig. 2. Champetier de Ribes balloon.

Thus there is increased danger of sepsis. The bags, owing to the inherent weakness of the elastic rubber of which they are made, often break. As the cervix becomes taken up, the bags cease to fit in the shortened canal, and are more and more likely to be forced out by the advancing head. Even the largest size does not completely dilate the os, at least not enough to permit the safe use of forceps. The chief legitimate use of the Barnes bags is in the induction of premature labor when haste is not an important factor.

The elastic conical or sausage-shaped rubber bag represents the second variety of type. The colpeurynter, as its name implies, is intended for introduction into the vagina for various purposes, mainly to check hemorrhage and to excite uterine contractions. The metreurynter or hysteurynter is typified by the Braun bag, and is intended to be introduced within the internal os, to be filled with fluid, and to dilate the cervical canal like the bag of membranes. For this purpose it is adapted by its conical shape. For introduction into the lower uterine segment the colpeurynter and the elastic metreurynter are imperfect because of their very

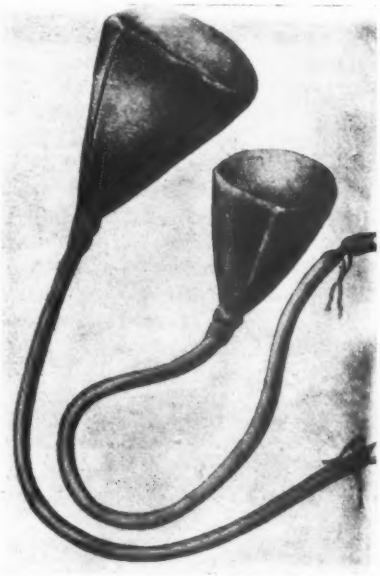


Fig. 3. Voorhees balloon.

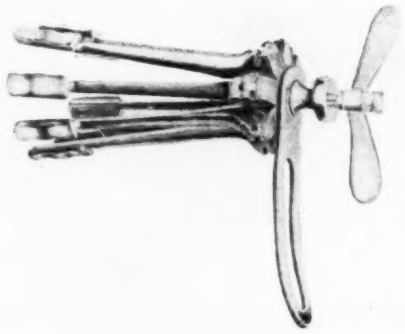


Fig. 4. Kaiser's dilator.

elasticity. Unless filled very tightly with fluid up to the limit of their capacity, they may be forced out by the pressure of the presenting part. The portion protruding from the external os is not under the same pressure as that within the cervical canal and uterus, and the fluid from the latter may be forced into the former so as to dilate it. Thus, by a sort of amœboid movement, the whole bag may be extruded into the vagina or out into the world without attaining its object of complete dilatation of the cervical canal. The full capacity of an elastic bag cannot be known, and there is always danger of breaking one if too much fluid is injected, or, on the other hand, of favoring its premature expulsion if too little is injected.

Bag dilatation is the nearest of any to the physiological method. The pressure on the cervical muscles is from above downwards, like that of the bag of waters or the presenting part. It aids in shortening the cervix as well as in dilating it, and, also, is a potent factor in starting up pains or stimulating weak contractions. Again, its value as a tampon is great, especially in cases of placenta prævia.

The third type of bag, the inelastic balloon, first introduced into obstetrics some ten years ago by Champetier de Ribes of Paris, is the best of all metreurynters. His typical pattern is the large-sized conical bag, made of silk, covered inside and outside with rubber. The distal end of the bag changes its shape from that of a perfect cone, inasmuch as it passes into the entrance-tube with a sort of pelvic

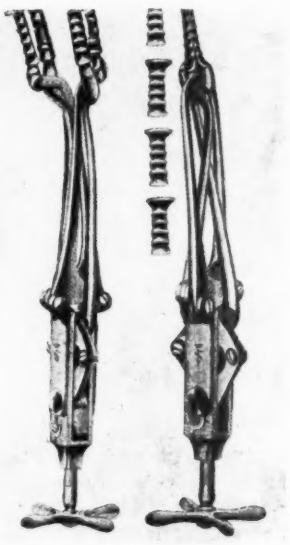


Fig. 5. Bossi's dilator. Usual model.

curve. The full-sized balloon holds five hundred cubic centimeters, and no more. There is therefore no doubt when it is filled. Because of its non-elastic character, it cannot lose its shape. The silk prevents it from becoming weak, as rubber does with time, and therefore there is small danger of rupturing one. De Ribes invented a special forceps for introducing the bag, but this is merely a convenience and not a necessity. The introduction of the bag is easy, provided the head is not too low in the pelvis and pressing on the cervix. When the head is pressing low and the cervix is well taken up and the os is so little dilated that it is necessary to employ artificial means to complete dilatation, some other method than that of the bag must be employed. In most instances the use of the bag will have been indicated before the head is so low and before the cervix has been taken up. In such the bag acts like the normal membranes, advancing in a conical form in front of the presenting part in an almost perfectly physiological manner. In addition, there is the possibility of increasing the dilating force of the bag when the normal uterine contractions are absent or insufficient, or when it is desired to increase the tamponing effect, by traction upon the tube of the balloon. Traction may be by the hand of the operator or by attaching a weight or spring balance to the tube. It is just here that the danger of lacerations comes in, and too much traction must not be exercised. Experience has shown that a weight of about two pounds is harmless. The smaller sizes of the de Ribes bag do not have the pelvic curve. The Voorhees bag differs from the de Ribes in having the middle layer of fabric made of linen instead of silk, and in not having the pelvic curve.

Wyder, in Winckel's *Handbuch*, seems very friendly to bag dilatation, considering it the method nearest to the physiological ideal. It dilates from above downwards, on account of its conical shape. Since it dilates the internal os and the upper portion of the cervical canal before the lower portions, it aids in the effacement of the cervix. The pressure of the filled bag within the lower uterine segment upon the ganglia in that region sets up the nervous mechanism of uterine contractions. The technique is simpler and more easy than with the metallic dilators, but the method is thought by many not to be quick enough for cases where life is in imminent danger and where immediate delivery is imperative. Traction on the bag by means of the filling-tube obviates the delay, but at the expense of increased danger of tearing the cervix. Just as in other methods of dilatation, the cervix sometimes contracts again after the dilatation has once been complete. This late spastic contraction of the os upon the after-coming head after version is sometimes of serious moment. Wyder thinks that there is less danger of sepsis in the bag dilatation than in the Bossi method, although he advises that the bag be removed occasionally for the purpose of sterilization. Traction on the bag not only increases the

Fig. 6. Bossi's dilator. Latest model.

dilatation directly, but also strongly stimulates the pains. Wyder recommends the method for the general practitioner.

Zimmermann reported 645 cases in which metreurysis was employed. 27 mothers died; that is, 4.2 per cent. In 93 cases the puerperium was febrile; that is, 14 per cent. 446 children were born living.

The indications for metreurysis are, induction of abortion and premature labor, cases where rapid termination of the labor is indicated, and placenta prævia. Authorities differ as to whether the membranes should be ruptured before introduction of the balloon. In cases of placenta prævia, Küstner, Dührssen, Graefe, Blacker, and Holowko recommend that the bag be introduced directly into the cavity of the ovum, after rupturing the membranes. Martin, Ahlfeld, Maürer, and Kaufmann recommend that it be introduced between the membranes and the uterine wall. In other conditions than placenta prævia, most authorities recommend rupturing the membranes only when there is excessive stretching, as in hydramnios or in eclampsia, where rupture of the membranes always has a favorable influence on the spasms. Fractional filling of the bag is often better than complete filling. Complete filling often excites excessive pains which might, in some instances, cause rupture of the uterus. Fractional filling renders the conditions rather more like those with the normal bag of membranes.

At the Russian Congress for Obstetrics and Gynecology in 1903, Stroganoff read a paper on accouchement forcé, in which he stated that, for progressive dilatation of the os, the metreurynter suffices; for quicker work he recommends manual dilatation, especially by the method of Edgar. If great haste is imperative, he performs Cæsarean section. He would limit very closely the indications for the use of Bossi's instrument. Ivanoff, in the discussion, stated he had employed accouchement forcé 78 times in 13,590 labors. The colpeurynter was used 26 times, and cervical incisions in the other cases. In 55 cases, forceps were used after the dilatation to complete labor. The mortality of the mothers was 39 per cent; of the children, 15 per cent. Alexandro thought that the metreurynter worked as quickly as manual dilatation.

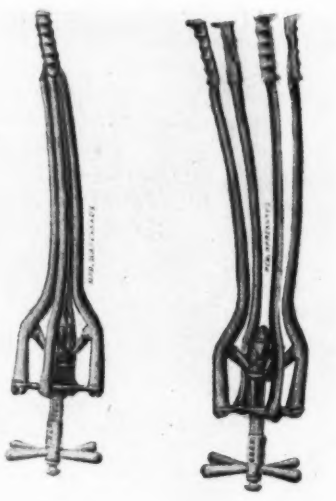


Fig. 7. Preiss's dilator.

Knapp, in 1896, recommends colpeurysis as the best method of dilatation in eclampsia where accouchement forcé is indicated. In 1899 he first employed Bossi's method and thereafter recommended it. Pollak, although a great friend of the Bossi dilator, yet advises for most cases of placenta prævia metreurysis instead of the metallic instrument. This is because these cases usually require some sort of tamponade at the beginning of dilatation when the danger of fatal hemorrhage is very great. Zangenmeister and L. Meyer agree that Bossi's method is contraindicated in placenta prævia. Even Knapp thinks that this condition is its weakest indication. As Dührssen says, "In placenta prævia the indication is not for quick delivery, but for safe hæmostasis." Safe hæmostasis is certainly secured by the conical non-elastic bag, and as hasty dilatation of the cervix as is consistent with safety of the structures involved is also secured. Traction upon the bag enables a greater force of dilatation to be employed, even to a dangerous extent, if due care is not exercised. Indeed, where lesions of the cervix have been reported it has usually happened that speed was considered an essential in the case, and quick extraction of the fœtus resorted to.

The most recent article of importance on the subject of bag dilatation is by Bürger, from Schauta's clinic in Vienna. He traces the history of hysteurysis and colpeurysis from the time Carl Braun first introduced the rubber bag into obstetrics in the form of his conical elastic rubber colpeurynter. Braun's indications, on the basis of 18 cases, were: 1. Metrorrhagia during the dilatation period and after the delivery of the placenta; 2. Pelvic contraction with vertex presentation, as a means of dilatation or to preserve the membranes against too early rupture; 3. In transverse presentation with normal pelvis as a preparation for version; 4. For hastening labor in eclampsia; 5. For holding back, in the last part of pregnancy, a vagino-intestinal hernia; 6. For starting artificial premature labor in cases of pelvic contraction. Braun calls his method "simple, easy, and without danger."

Tarnier, in 1862, constructed a dilator for intrauterine use, composed of a catheter over which a rubber tube was placed. This was passed through the internal os and filled with fluid. At about the same time Barnes had brought forward his fiddle-shaped bags. Schauta, in 1883, first placed a balloon within the uterine cavity itself and elaborated strict

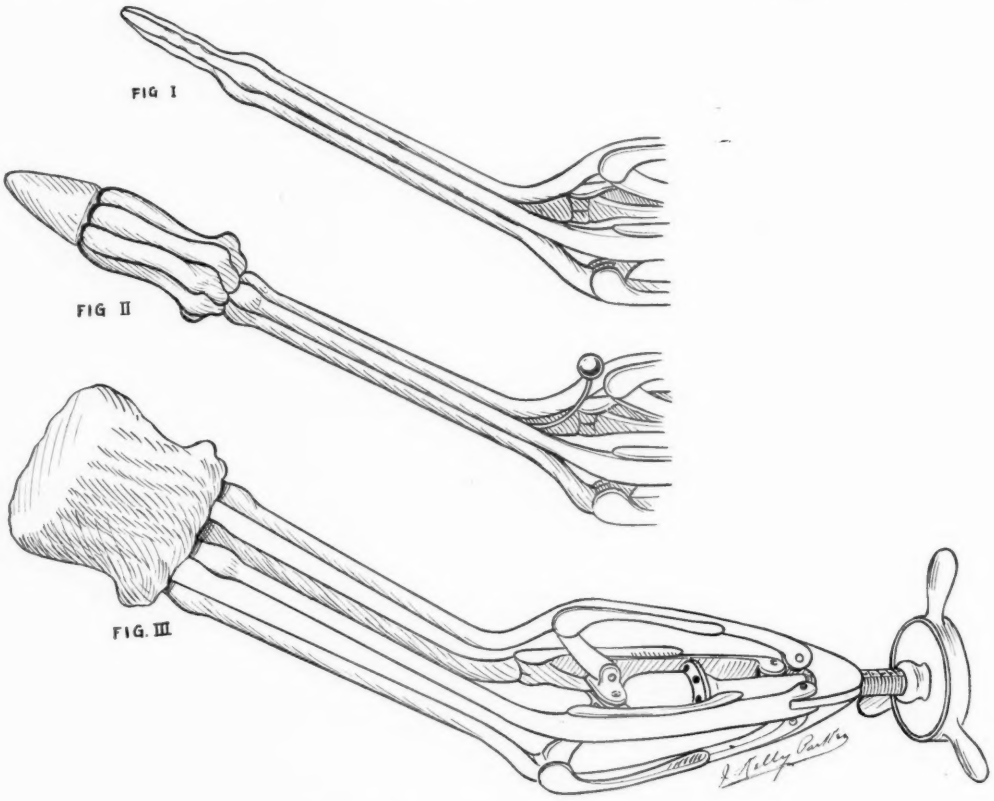
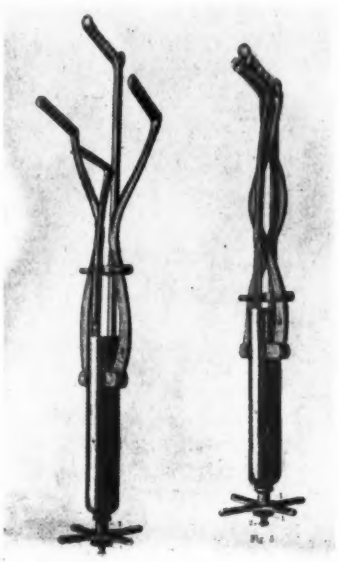


Fig. 8. Knapp's dilator. One half actual size.
Fig. I. Dilator closed.
II. Dilator with conductor and jointed ring for the partially dilated cervix.
III. Dilator with jointed ring and rubber cap for a dilatation of 6 cm.

indications for its use, as follows: 1. In transverse presentations with early rupture of the membranes; 2. Vertex presentations, with early rupture of membranes and relatively roomy pelvis; 3. Prolapsed cord or extremity after reposition; 4. Partial placenta prævia, with early rupture of membranes and hemorrhage; 5. To stimulate contractions when pains are weak after rupture of the membranes. Maürer, in 1887, added traction on the balloon in cases of placenta prævia. There are these three principles of the metreurynter: the elastic bag of Braun, Maürer's traction on the bag, and the non-elastic cone of Champetier de Ribes.

The advocates of the bag method of dilatation argue that it is the most physiological method. The local center of uterine contractions is in the retrouterine cervical ganglia. Pressure of the child's body or of the balloon upon these ganglia causes augmentation of the pains in a natural manner. The eccentric pull of the longitudinal fibers of the uterine muscle upon the circular fibers of the cervix is preserved. There is a consequent dilatation of the lower uterine segment. Also, the direct dilating force of the bags is over the whole surface of the cervix, and not alone in places, as with the metallic dilator. Again, the action of the conical bag is like that of the natural bag of waters; namely, from above downwards. This wedge-like force is increased by traction on the tube of the bag. Therefore the bag acts in two ways; to mechanically dilate and to stimulate uterine contractions.

Sterilization by boiling is easy and may be often repeated. Sterilization by the vapor of formaldehyde may also be easily employed. The balloon may be introduced through an aperture large enough for the No. 14 Hegar dilator. If the os is too small to admit the bag, it should be first dilated sufficiently by the Hegar or Goodell instrument. The bladder and rectum must first be empty. The vaginal canal should be opened by a speculum, and the bag, folded into a small space, passed by sight and in a way to avoid contamination by the vulva, etc. It may then be filled either by a syringe or by the irrigator. If the latter is used, it may be retained in connection with the filling-tube and hung high or low. Thus the pressure within the bag may be regulated,



a *b*

Fig. 9. De Seigneux's dilator. *a*. Open, with medium size arms. *b*. Closed, with same.

and it may be tightly filled or only fractionally filled. If pains are too strong, the irrigator may be lowered and the bag be thus partly emptied. If originally aseptic and introduced without sepsis, it may remain as long as twenty-four hours, if necessary. It is not necessary to follow Braun's *dictum* and change for a clean balloon every six to eight hours. The balloon may be used without narcosis. It has also many useful functions besides that of dilatation. It hinders the too early rupture of the membranes or the too rapid escape of the waters. It takes the place of the bag of waters when that is ruptured. In transverse presentations it hinders the descent of the shoulder and thereby prevents impaction. It is especially valuable in the treatment of placenta prævia, and is especially useful for the private practitioner.

Among the authors who favor the bag dilatation over that by the metallic instruments are Osterloh (who holds that the Bossi method is unsuitable for private practice), Bardeleben, Keilmann, Dührssen (who prefers it to Bossi's), Ostreil, and Blaker.

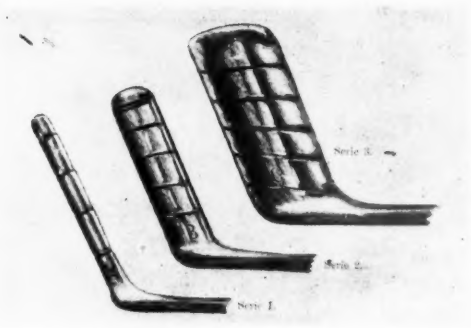


Fig. 10. Tips of different arms of de Seigneux's dilator. Actual size.

Bürger bases his article upon 117 cases of the use of the hysteurynter.

There were seven groups of cases.

1. To save membranes in cases of contracted pelves. Of this group there were five cases. All the mothers recovered; four children died (two were perforated).

2. As a substitute for the membranes. Of this group there were eight cases; four with prolapsed cord or extremity. All the mothers recovered; one child was still-born.

3. As a mechanical dilator. In this group, ten were cases of premature rupture, with pelvic contraction. All the mothers recovered and six children died (five perforated). Fifteen cases were of transverse presentation, with premature rupture of the membranes. One case required cervical incisions on account of recontraction of the cervix upon the after-coming head. All mothers recovered, and four children were lost (one perforated).

4. For scars from previous operations. There were three cases of this group, in one of which the operator had to resort to cervical incisions. All mothers and children recovered.

5. Dangerous conditions of the mother, demanding delivery. Of this group, there were seven cases of high temperature, in which all the mothers recovered and three children were lost (two perforated). There were two cases of premature detachment of the placenta (placenta ablata). Both mothers were saved, but both children died. There were two cases of heart lesion. The mothers died and the children were perforated in both instances. There was one case of severe nephritis, where mother and child were both saved. There were forty-five cases of eclampsia. In four of these cases, cervical incisions were also used, on account of recontraction of the cervix upon the after-coming head. Thirty-five of the eclampsia cases were primiparæ. Various operations to hasten labor were performed after dilating the cervical canal with the bags. The time of dilatation varied from fifteen minutes to one hour. Nine mothers died; a mortality of about twenty per cent. Twenty-one children were born dead, many of them premature. Eleven were perforated. There were nineteen cases of placenta prævia. In Schauta's clinic the membranes are opened in placenta prævia partialis and the placenta is perforated in placenta prævia centralis. In other words, the bag is introduced within the amniotic cavity. The action of the balloon is both hæmostatic and dilating. Most authorities consider the prognosis better for the child with the balloon than by the bipolar version method of Braxton-Hicks. Eleven of the cases were of the partial variety, five of the central

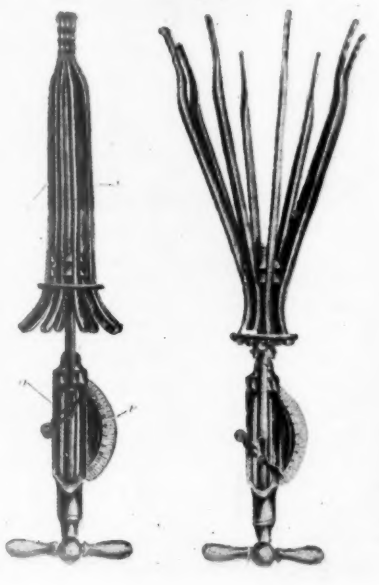


Fig. 11. Frömmer's eight-armed dilator.

and three of deep lateral insertions. Three mothers died; a mortality of fifteen per cent. Five children were born dead; fifteen alive (once twins). The duration of the dilatation in the cases where manual pull on the bag was employed was from five to fifteen minutes. Where a weight was used, fifteen minutes to one and a half hours.

With moderate care and with overcoming of the temptation to hasten unduly, the bag method of dilatation is accompanied with very little danger. It must be remembered, however, that some lesions may follow its use. For instance, Leopold thinks that the introduction of the balloon is difficult without doing injury when the os is only slightly dilated at the beginning. Franqué once saw an incomplete rupture of the uterus following metreurysis. Cases of injury, even of rupture of the uterus, are not unrecorded of placenta prævia, but in most of these cases there was too much haste in delivery after hemorrhage was stopped. In many instances the version and immediate extraction could be accused of causing the lesion. Hübl, Hink, and Hauffe report cases of rupture with use of the bags.

The third group of bloodless methods of dilatation of the cervix at term is by means of metallic dilators, usually those with expanding branches. The Hegar type of metal dilator is only adapted to cases of abortion or as a means of starting the dilatation before using other methods, since it is impossible to get more than a small degree of opening of the os by its use. The principle of the Hegar dilator is the same as that of the urethral sound. It is forced into the canal by gentle pressure from below, and stretches the fibrous and muscular tissues to the extent of its diameter; then a slightly larger size is passed until the largest caliber possible is employed. With the Hegar set of dilators the largest number gives a dilatation of little more than an inch in diameter. This, of course, is sufficient for induction of abortion, for dilatation preliminary to curettement, etc., or for dilatation preliminary to manual, balloon, or other method.

Almost all the dilators of the metallic type are of the branching variety. The origin of the idea of branching metallic dilators is lost in antiquity. The two-bladed instruments of Goodell and Ellinger are familiar to every gynecologist, although to the obstetrician only of limited utility. The instrument of Gau, depicted in most modern text-books, allows of a moderate degree of dilatation, but stops far short of completeness.

Tarnier of Paris, in 1862, published an account of his écarteur. This instrument consists of three blades, capable of individual introduction and uniting in a joint at the middle of each. The uterine end of each blade was flattened out into a plate about an inch wide, and bent over into a flange at the extreme end to prevent slipping out. Its introduction requires a preliminary dilatation, enough to admit one finger. The handles are to be encircled by a rubber band, which acts as the dilating force. The instrument is without danger under proper care, and is of considerable usefulness, as I have myself proved in many cases. But it is not rapid, unless one departs from the use of the rubber band and attempts to get dilatation by means of the hand pressing on the handles, when it also becomes dangerous. Since the knowledge of the non-elastic conical bag has become more general, the indication for the instrument of Tarnier has become very much more limited. Heikel, of Heinricius's clinic at Helsingfors, Finland, reports a series of forty cases where Tarnier's écarteur was employed. Of these cases, fourteen were without result, ten were rather weak, and the rest gave excellent results in dilatation. Pains were always started up or augmented. Six of the cases were of eclampsia; three for asphyxia of the child, one for high temperature of the mother, and the rest for prolonged labor. Heikel considers the method not quick, but, if the rubber bands are used, entirely safe.

In the consideration of the metallic dilators one must mention an anomalous instrument invented by Schwarzenbach and called by him a "tulip." It consists of five parts; four blades and a metallic sheath holding them all together when introduced. Each blade is composed of a long pedicle, numbered for identification, and a wide, rounded, thin spoon-like intrauterine extremity. Each blade is introduced separately, and then all are united into the sheath. The spoon-like extremities extend into the cavity of the uterus, lying along

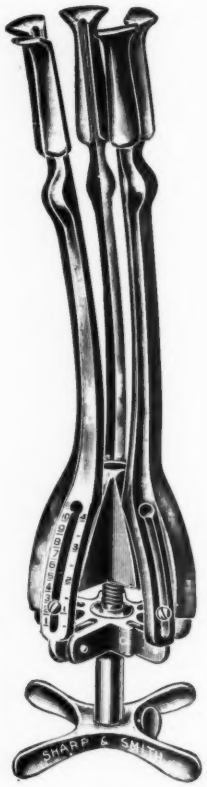


Fig. 14. Higgins dilator.

the walls thereof, and allowing the head or other presenting part to descend low into the cavity formed by them. Thus the instrument combines the advantages of a metallic dilator and those of a metreurynter without, as in the latter, causing displacement of the presenting part. It can be used even with a head lying quite low in the pelvis. It is theoretically correct, but is difficult of application. Its use, as reported in the literature, is extremely limited; as far as I have been able to ascertain, to eight cases.

During the last few years the subject of metallic dilatation of the cervical canal at term has been revived on account of the great interest excited over the introduction into Germany of the so-called Bossi dilator. The principle of metallic dilatation of the os by branching instruments is as old as historical obstetrics. Osiander, Busch, and Hyerneaux employed metallic dilators, and many varieties have been brought to the professional notice during the last centuries.

In 1889, Bossi of Genoa began to use an instrument devised by himself, consisting of three blades which separated by the action of a screw working at the distal end and pushing a metal cone between the shanks of the blades. Because of the great distance between the dilated blades he soon added a fourth blade. He first described his method in 1891. It was used to a considerable extent in Italy and less in France for about ten years, but was practically unknown to the rest of the world until Bossi read a report of his work on upwards of one hundred and fifty cases before the International Medical Congress in Berlin in 1900. Leopold, who was present, became infatuated with the idea, and began at once to use it in his clinic in Dresden. He reported seventeen cases in 1902, and highly recommended the method. On the strength of such high German authority, the Bossi idea was quickly introduced into nearly every clinic in the Fatherland, and consequently the bulk of literature on the subject in now appalling. Indeed, articles on the subject are appearing faster than one can read them. Williams states his opinion that Leopold did not previously have much experience with accouchement forcé, and therefore became enthusiastic over Bossi. Leopold admits that he had never had any experience with the manual method.

As usual, American obstetricians followed the Germans, and now are contributing much to the volume of literature of the subject. All the time, Lott, in North Carolina, had been using and recommending an instrument invented by himself, independently of Bossi, ten years before he or any one else in this country had heard of Bossi's methods. Lott published in the *North Carolina Medical Journal*, in 1892, the description of an instrument very similar to that of Bossi's. In that publication appears a picture of a four-bladed dilator with a handle at right angles to the rest of the instrument and with a screw at the distal end which pulls a wedge between the blades and thus dilates them. It allows

of a dilatation of three to three and one half inches in diameter.

The Bossi type which was recommended by Leopold was an instrument of four arms. When open they allow of a dilatation of 8–10 cm. The arms can all four be inserted into an opening of the os of less than half a centimeter in diameter. Each arm has a bayonet curve about two inches from the uterine end to prevent going in too far. After the os has been dilated up to a diameter of a few centimeters, the proximal ends of the blades can be covered with metal caps armed with a flange at the extreme uterine ends and about one and one half centimeters wide each, so that a larger surface impinges upon the surface of the dilating cervix. This is to obviate the danger of the sharp ends of the blades cutting or bruising the cervical tissues and thus starting lacerations. The dilatation of the blades is controlled by a screw at the distal end of the instrument. Bossi and Leopold advise that the screw be turned slowly, allowing two to three minutes between each turn. The effect upon the tissues is supposed to be judged by the finger passed from time to time between the dilating blades. Except in eclampsia, the instrument is to be used without narcosis. It is usual to retract the perineum by means of a Simon speculum and to draw down the cervix by a vulsella. Then the dilator is passed into the os under the guidance of the eyes, is screwed open enough to stretch the borders of the os, and then the screw is turned slowly, as already stated. If the tissues are very rigid, one must go slower. At 9–10 cm. the dilatation is enough to permit of the use of forceps or performance of other obstetrical operations. Full dilatation is supposed to take place in from fifteen to thirty-five minutes. Bossi claimed that the average duration of the dilatation was twenty-four minutes.

In a recent publication Bossi has collected a large number of cases where his principle had been employed outside of Italy, and he saw a more or less general agreement as to its utility. Especially was it employed in the clinics of Prague, Dresden, Vienna, Berlin, and Copenhagen.

His latest model has been considerably changed from the first four-armed instrument.

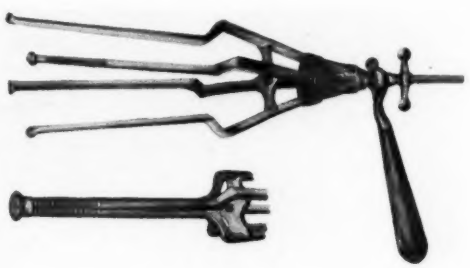


Fig. 15. Lott's instrument.

The four arms are still retained, but the screw, instead of acting in a line parallel with the blades, is placed at right angles thereto, like the screw in a cranioclast. The fundamental basis of the new type is the crossing of four blades, the ends of which are made with bayonet-shaped elbows, which cross when the instrument is closed. The two long handles are drawn together by the screw at the distal end. By means of elbow-joints, which work as the large handles come together, the two shorter handles, placed at right angles to the large ones, are also brought together and all four blades are dilated equally. There is a scale on the stem of the screw, indicating the amount of dilatation. The handles may be compressed manually, and thus one may get the sensation of how much pressure is being brought to bear. The new type of instrument weighs only 575 grams, much lighter than his earlier models.

Ricci recommends that the patient be laid across the bed, the bladder and rectum emptied, and the instrument inserted under the guidance of sight. After removal of the instrument on complete dilatation, the delivery should be completed by forceps rather than by version. There is danger that the after-coming head may be held by the recontracting cervix. In induction of labor it is necessary to leave the instrument in only long enough to start up vigorous pains. Boerma, in Holland, reports thirteen recent cases of dilatation by the Bossi method. He considers it useful, but not without danger from lacerations, hemorrhage, and the temptation, on account of its ease and convenience, to use it for personal indications.

Hammerschlag reports seventeen cases of Bossi dilatation from his clinic in Königsberg. Eight were for eclampsia, in all of which there were lacerations of the cervix noticeable post-partum. One of the mothers died and two of the children (one perforated). There was severe hemorrhage in two cases. Five cases were of ante-partum infection, evidenced by high temperature. Of these, four had more or less marked lacerations of the cervix and three had considerable post-partum hemorrhage. All the mothers recovered, and all children, except one premature case. One case was of placenta ablata, in which there was a slight tear and no hemorrhage. The child was perforated, but the mother recovered. Three cases were done for prolapse of the cord. Of these, there was a marked tear in one, post-partum hemorrhage in one, and one child dead. All the mothers recovered. In all of these seventeen cases, delivery took place within three quarters of an hour after beginning the use of the dilator. Other methods Hammerschlag considers longer, and, although he had so many lacerations, he seems satisfied with the method in general. In his eight Bossi cases for eclampsia, Hammerschlag had one mother die and four children; in eight previous cases by other methods, he had lost three mothers and four children. Placenta ablata he considers particularly adapted for the Bossi method. He formulates the following conclusions: The method makes possible, without much technical difficulty, a quicker delivery than other methods. The danger of lacerations is considerable. The method should be used only by the expert, and only for the strictest indications on the part of the mother, such as eclampsia, infection, placenta ablata, and severe internal diseases. In all cases in which great haste is not imperative, metreurysis is better. The method is contra-indicated in placenta prævia and in very marked rigidity of the os. It is not indicated to operate in the interest of the child alone when great danger is thereby caused to the mother.

Sterno Elbing thought that the pelvic curve in most models was too slight, and therefore the wounds in the cervix were usually in the posterior wall.

On the recommendation of Leopold, Bossi's dilator was first used in Finland in Heinricius's clinic at Helsingfors, from which Hahl reports eleven cases. Six cases were of eclampsia, in which all the mothers finally recovered, although one had a prolonged convalescence, and two children died. There was one case of placenta ablata, fatal to the child, but in which the mother recovered, after a sharp hemorrhage. One was a case of cystic mole, which resulted favorably to the woman. Three cases were of delayed labor on account of contracted pelvis. All mothers recovered, although in one case symphyseotomy was performed. One child died of cerebral hemorrhage. Hahl concludes that the Bossi method is a valuable aid in obstetrics when used with care. He even thinks it may be allowed to the general practitioner. He believes that uterine contractions are not very much influenced by the instrument. He opposes the method in placenta prævia.

Muus gives a *résumé* of thirty-five cases in which Bossi's method was employed. Twenty-two were primiparæ. Full dilatation was obtained on the average in half an hour. Fifteen were for eclampsia. Twice it was attempted without result in abortion with tough cervix. Twice, quick dilatation was done on the moribund for the sake of the child; in both cases, with extensive tears, as shown at autopsy. As for the other cases, thirteen had no lacerations and seventeen one or more unimportant tears; one only had a great tear, but without hemorrhage.

Smith of Dublin reports four cases of Bossi's method; three for eclampsia and one for low insertion of the placenta. In the former no bad results followed, but in the latter there was a ruptured cervix requiring sutures. In all four cases the labor had already begun; all mothers recovered.

Katz, from a study of seventy-eight cases in various German clinics, concludes that the method is without great technical difficulties. It permits quick delivery, although with some danger of lacerations. It should be employed only under strict indications on the side of the mother, such as eclampsia, placenta ablata, severe internal diseases, severe infection. It is contraindicated in placenta prævia. He opposes Leopold's *dictum* that the method is

adapted for the general practitioner, and would confine it to clinics until more is proven as to its harmlessness.

Grekow of St. Petersburg gives his results in six cases, using the Preiss modification of the Bossi instrument. Five of these were of eclampsia and one of tetanic contraction of the uterus. He concludes that the method is indicated in all cases where quick ending of the labor is desirable, especially in primiparæ and after the cervix has been effaced. It is especially desirable in eclampsia where a rigid os and a low-lying head prevent the metreurynter. On account of danger of tears and sepsis, he would not recommend it in general practice. The Preiss instrument is readily aseptible.

von Fellenberg, on a basis of six cases in the Berne clinic, concludes that the method is relatively without danger with a softened cervix and performed slowly. He thinks the tears which occur are rarely serious and usually take place at the exit of the child. He recommends, after full dilatation, holding the instrument screwed tight for a few moments to prevent recontraction of the cervix.

Ehrlich analyzes thirty new cases from the Dresden clinic and the seventeen previously reported by Leopold. Thirty-one were eclamptics, of whom six died from eclampsia and complications and one of severe coincident heart disease. Five women had ante-partum fever and all recovered. There were two cases of severe cramps of the uterus, two of late stages of phthisis, six of delayed labor on account of contracted pelves, and two in which there was danger to the child. This author thinks the method is specific in eclampsia, as opposed to Cæsarean section. He also recommends it for placenta ablata and instead of Cæsarean section on the moribund. He is opposed to its use to complete dilatation in placenta prævia. It is especially adapted for cases where the cervix is thinned. Seventy-five per cent of these cases showed no trauma, or very slight lesions; twenty-one per cent, moderate tears, and four per cent, severe lacerations. In no case was there a marked puerperal complication. He believes that uterine contractions are stimulated by the instrument.

Knapp recommends Bossi's principle in the following indications: 1. For dilating the uterine and cervical canals after abortion, preliminary to emptying. 2. To enable the metreurynter to be introduced where the dilatation is not yet enough for that instrument; 3. For dilating the canal as preliminary to performance of version or other obstetrical operations, or for accouchement forcé; 4. In cases of abnormal rigidity of the os, and to stimulate pains in such cases. Difficulty comes with a deep-seated head. Special care must be exercised to avoid tears. To avoid lacerations by the expanding blades, Knapp has devised an instrument, a modification of Bossi's, which has a sort of napkin-ring arrangement to be placed over the blades as soon as the dilatation has progressed a little, in order to distribute the pressure over the whole surface of the cervical and lower uterine walls. This ring is made of a large number of metal rods arranged diagonally to one another and fastened to one another by rivet joints on the principle of a certain flexible bracelet often used by women for ornamental purposes. He has also simplified the mechanism of the instrument as a whole and has added a pelvic curve. It is larger at the outer end, thus dilating, also, the vaginal canal. Four blades are joined by hinges at the distal end. Through a base at that end, to which the blades are attached, passes a screw, ending proximally in a shaft which is joined to four short pieces by hinges. These pieces are themselves joined by a hinge each to its own arm of the dilator, a little proximal to the middle. As the screw moves inwards it pushes apart the blades. Closed, the four ends of the blades make a small cone. After the blades are a little dilated, the bracelet is slipped on over the ends. This bracelet or napkin-ring is composed of twenty-four crossed, joined, flat pickets, which separate as the instrument dilates. For additional precaution the ring may be covered with rubber. The instrument is lighter in weight than the original models of Bossi, and is shorter. In Knapp's later model the screw is made very fine, so that a very slow dilatation is secured. Knapp appreciates that the instrument is not without danger, but considers that the dangers are no greater than with any method of artificial dilatation.

Nagel considers that artificial dilatation is

only indicated in the presence of danger to the mother's life (eclampsia, lung disease, heart disease, and cyanosis), requiring hasty delivery. He would add occasionally those very rare cases where, with pressing indications on the part of the mother, a child-saving operation is not possible, because of undilated os.

Pomorski of Humán, Poland, reports five cases of eclampsia in private practice treated by the Bossi instrument. All mothers lived, and four children (one perforated).

Pollak, of Chrobak's clinic in Vienna, after giving a *résumé* of the history of accouchement forcé, reports ten cases of Bossi dilatation. He employed an instrument of his own, which he calls the "Aesculapdilatator." This is lighter than Bossi's earlier models, and has a pelvic curve a little more pronounced. There is a more simple arrangement of the screw action in dilating. It possesses the added advantage of being easily and quickly taken apart and put together again for cleaning. The blades are opened by a moving cone which moves between their bases by action of a screw. Pollak's ten cases were: One for eclampsia; two for placenta prævia; five for high temperature; two for artificial abortion in contracted pelves. All the mothers recovered. There were no serious tears in any case. Pains were usually soon set up. For the cases of placenta prævia the instrumental dilatation was only to a degree to enable the bipolar version and pulling down of a leg. For most cases of placenta prævia he would advise metreurysis instead of metallic dilatation.

De Seigneux supports Leopold's view that the Bossi principle has a definite place in certain complications of pregnancy and labor, especially eclampsia. In Leopold's clinic, out of thirty-one cases of severe eclampsia treated thus, only six resulted fatally for the mother. The bad results reported by others are believed by de Seigneux to be due to technical errors or to faults in the type of instrument used. Bossi's is not an ideal instrument. The dilator should have such a pelvic curve that the plane of dilatation shall be parallel to the plane of the superior strait and so that the dilatation can be completed without any slipping of the os. The surfaces of the dilating blades should be as wide as possible. He has invented an instrument which he believes fulfills these qualifications. His instrument consists of a handle, within which the dilating mechanism lies, and four movable branches, bent at the ends, which fit into the handle. The branches move at their bent dilating ends in a plane parallel to the long axis of the instrument. The branches can be easily removed, after partial dilatation is effected, and can be replaced by branches with wider ends. The branches are laid in separately like the blades of forceps, are fastened to the handle mechanism, and are then opened by means of a screw at the distal end of the instrument. The points of superiority over Bossi's models are: 1. The opening proceeds parallel to the plane of the inlet, a thing impossible in Bossi's; 2. There is less danger of tearing the cervix or external os, and this danger is further lessened by the possibility of applying wider branches; 3. The instrument can be quickly taken apart and put together again, thus being easy to clean and sterilize; 4. With one general introduction, several series of branches can be introduced; 5. No assistant is needed for the instrument, since it holds itself in.

De Seigneux has employed his instrument in twelve cases, with uniformly good results, and he refers to seven other cases where it was used in the Dresden clinic. There were no serious lesions. The author considers it adapted for the general practitioner as well as the specialist. For induction of premature labor and abortion he uses it as a preliminary to the metreurynter.

Frömmer's modification of Bossi's dilator consists of eight instead of four dilating arms. The intention is to distribute the pressure of the arms over a wide surface, so as to avoid lacerating and bruising. Eight thin arms fold into a cone narrowing sharply for the last few centimeters at the proximal end. The distal ends flare out a little, and, by means of a screw, a ring is pulled down over these distal ends, while the arms are held apart by a round nut inside the arms near the distal end. Thus the proximal or cervical ends of the arms are widely separated. Fully separated, the arms make a cone inverted, thus dilating the vagina as well as the cervix. The disadvantage of Frömmer's type is that it is impossible with it to feel with the examining finger between the

branches to test the tenseness of the cervical tissues.

Of late, Frömmer's instrument has been used in many German clinics. Walcher describes a new dilator devised by him, which in most essential features resembles Frömmer's. There are eight branches, removable, but fitted with knobs in the hollow stem, so that, when the instrument is put together, it cannot fall apart. A button at the distal end between the blades is moved by a screw which opens the branches. A scale on the screw near the handle shows the amount of dilatation. The ends of the branches are protected by bayonet-shaped curves to prevent insertion too far. Walcher reports three cases with his type of dilator. All were of eclampsia in primiparæ with closed os and uneffaced cervix. Dilatation averaged thirty-five minutes. There were no larger tears than usual in normal labors.

Schauta formerly opposed Bossi's method on account of its lack of physiological action and its danger, when not in expert hands, of causing serious lacerations. Cristofoletti, however, reports five cases in Schauta's clinic. One was for placenta ablata, three for eclampsia, and one for nephritis. In the case of placenta ablata the mother died; in the others the mother recovered. One of the eclampsia cases was transferred to the insane wards. Two children were perforated and two others were born dead. In one case a blade cut deeply into the tissues so as to cause severe hemorrhage and had to be removed before dilatation was complete. Cristofoletti's conclusions are by no means favorable to metallic dilatation. The prevailing method in Schauta's clinic for many years has been the balloon, preceded, if necessary, by Hegar's sounds.

Krull of Munich describes a new dilator with three branches in conical form with a slight pelvic curve. At the base of the cone is a plate which receives the arms. It can be replaced by an eight-armed plate if desired. A screw pushes a disk between the blades, thus dilating them. It is simply constructed and easily cleaned.

Preiss's modification of the Bossi model is an instrument with four dilating branches. A screw supplies the dilating force through a base-plate and four levers near the distal end. The blades lie close together in the undilated condition until near the distal extremity. There is a slight pelvic curve. The instrument is simple in construction and light in weight. Schürmann, on the basis of ten cases of the use of Preiss's instrument, concludes that it is safe and conservative, provided the portio is effaced. The indication is less apparent when the cervix is elongated.

Considering that there are some cases not adapted to the use of the manual method, Philander Harris has himself invented a metallic dilator which he has used a few times with success. The instrument consists of two levers about twelve inches long, with a fulcrum near the center of each. One lever has a pin through its center, either end of which serves as a fulcrum for the two short levers, which move in transverse plane to the long levers. Each pair of levers is provided with a bolt and thumb-nut with which to hold all advancement gained. The spring of the levers effects the tonic strain. When the limit of the long levers is reached, the two short ones are introduced. These effect the complete dilatation. The levers are introduced one after another.

Higgins of Boston holds that dilatation with the hand is more dangerous than with the Bossi principle, except in cases of placenta prævia. The Bossi models have too many screws, and are liable to imperfect disinfection on that account. Higgins has brought out a five-armed dilator, otherwise resembling Bossi's early models in many respects. There is a slight pelvic curve, and there are metal caps to place over the ends after dilatation has partly progressed. Full dilatation is possible in from twenty to thirty minutes. It should be used only under strict indications, most marked of which is eclampsia. It should be employed only where the cervix is tough. It is also useful for gynecological purposes and for artificial induction of premature labor or abortion. The author does not doubt that, even in skillful hands, forcible metallic dilatation, like forcible dilatation on other principles, in some cases will produce tears of moderate degree, and in unskillful hands, deep tears. This danger is present in all methods of accouchement forcé. He has known of two cases of rupture of the uterus under manual

dilatation. Deep tears even occur in spontaneous labors. He would reserve manual dilatation for the softer tissues of the multipara and Bossi for the more rigid tissues of the primipara where great speed is desired.

Leavitt of St. Paul has published the most recent account of a new dilator for obstetrical purposes. There are four arms or levers notched at the middle, with at one end a broad and at the other a narrow termination. Either end may be inserted into the cervix, the notch inserted in a corresponding notch in a disk joined by a staff with a handle. Each blade is thus inserted singly until all four are in. Then a rubber band is passed around the distal extremities of the arms and an elastic force of dilatation is exercised. He does not state whether he has used the instrument on the patient, except in one case mentioned.

While the literature is abundant of new dilators and of successful employment of the Bossi principle under various modifications, there is also abundant evidence of failure and of harm resulting from the method. Wirtz of Cologne reports four cases in which Bossi's method was employed. In one done for eclampsia, it required three fourths of an hour to get dilatation up to nine centimeters, and the woman died during delivery. There were no cervical wounds. Another did not dilate enough for the use of forceps after half an hour. Œdema of lungs threatened imminent death, and Cæsarean section was done on the moribund. There were no tears and no hemorrhages. The third was also eclamptic, and required one and one quarter hours to dilate up to nine centimeters. Delivery was by the axis-traction forceps, and death occurred on the third day, but without lacerations of moment and with no hemorrhage. The fourth case was of placenta prævia with extensive hemorrhage requiring tamponade. A foot could not be gotten through the narrow cervix, and Bossi's dilator was used to obtain a dilatation of four centimeters. This enabled a foot to be drawn down, and the hemorrhage was stayed. The mother recovered.

Schaller had a rupture of the non-pregnant uterus into the parametrium. He recalls his former recommendation of Bossi's method. König of Geneva publishes a collection of six cases of his own treated by the Bossi dilator, and concludes that the method is not without danger, especially when the dilatation reaches more than six or seven centimeters. He considers it contraindicted as long as the cervix is uneffaced. It should be utterly discarded for placenta prævia.

Henze of Breslau reported the use of Bossi's instrument in seventeen cases. Nine were for artificial premature labor, five for artificial labor at end of pregnancy, two for eclampsia, and one for placenta prævia. In the premature cases the os was dilated to about four to five centimeters, and then the case left to nature. Pains in all cases came on very soon after removal of the instrument. In both the cases of eclampsia the delivery was started with the os unopened, and in both there was a tear into the vaginal wall from the cervix. Once, in a five months' abortion, the instrument almost perforated the anterior of the cervix. In the case of placenta prævia he was compelled, because of severe hemorrhage, to cease before dilatation had hardly progressed. Stempel reported four cases of severe eclampsia. In one, death occurred within fourteen hours, and there was shown a deep tear into the vaginal wall; in another, death occurred in eighteen hours; in a third, requiring perforation of the child, death came on in fifteen days; and in a fourth, the mother recovered after version, extraction, perforation of the after-coming head, and severe lacerations of the cervical tissues. Fraenkel has had several severe tears with the metallic dilators, and warns against the method, especially in placenta prævia.

The question of an obstetrical procedure is not answered by a consideration of the immediate condition of the patient and child, but also largely by the remote and permanent consequences. To this question, Bardeleben, from Bumm's clinic in Berlin, brought the results of examinations made on women some time after recovery from the labor and puerperium, both those upon whom Bossi's operation had been performed and those who had not undergone that operation. Bardeleben examined, in the out-patient policlinic, 447 women who had been normally delivered at various times previously. Since they all came to the policlinic for relief, it follows that none

were examined who did not exhibit symptoms of one sort or another relative to the pelvic organs. In describing the results of these examinations, he called an os a *normal* multiparous one when the lateral lacerations did not reach more than half through the portio. *Small* portio tears were those where a little over half was lacerated; *large* portio tears were those which reached the border of the vagina; *cervical* tears, where the whole portio was torn or the tear extended into the cervical canal as far as the line of junction of cervix and vagina.

There were 13 cervical tears, 22 large portio tears, 53 small portio tears, and 359 normal multiparous portiones. With most large tears endometritis is induced through the entrance of germs via the open os and by way of the exposed mucous membrane. The sterility so frequent with large lacerations is usually due to this infection. In all, there were 88 lacerations out of the 447 cases; a percentage of 19.5. Of those who had artificial aid in their labors, 48.5 per cent had normal portiones, 21 per cent healed small tears of the portio, 18 per cent large portio lacerations, and 12 per cent cervical tears. Those whose labors had been spontaneous with full-term children showed 84 per cent of normal portiones, 11 per cent of small tears, 3.5 per cent of large portio tears, and 1.5 per cent of cervical tears. Ten cases were examined on an average of five months after labor, on whom the Bossi operation had been done. Four of these cases Bardeleben leaves out of the count because it is probable that they were caused by other means than the Bossi procedure itself. One case showed one small and one large portio tear, with metritis, but without ectropium. One showed a cicatricial os with a deep tear of the portio extending into the vault of the vagina, ectropium, and cervical catarrh. Another showed lacerations on each side almost to the vaginal vault, menorrhagia. Another showed a bilateral laceration of the portio, on the right side a scar extending to the parametrium ectropium, and cervical catarrh. One showed a deep unilateral laceration of the portio without ectropium. The last showed a thick cicatricial band at the base of the right broad ligament and arising from the cervix, dysmenorrhea, and menorrhagia. Thus it will be seen that all six of these cases had more or less extensive lacerations as results of the Bossi procedure.

Sellheim, Martin, Dührssen, and Bacon condemn Bossi's method or consider it dangerous. De Lee had three Bossi cases, all fatal. Zangenmeister, after a careful *résumé* of the Bossi method, warns against dilatation by the screw machines. He thinks the intrauterine balloon, even with a strong pull, better and almost as quick. Of the metallic branching dilators, he considers Tarnier's écarteur the most useful. The feeling of resistance at the screw is a poor indication of the amount of safe dilatation. The places where the blades impinged against the cervical wall are seen to be flattened. The wounds are often contused wounds at these places. Often there is not much bleeding, although an extensive tear. The danger of infection is increased in cases of contused lacerations. Spastic recontraction of the os, especially upon the after-coming head, seems to be a not uncommon source of danger and trouble after Bossi dilatation.

The advocates of the Bossi method recommend it for the general indication, where rapid delivery is imperative, on account of mother or child. These indications include, first of all, eclampsia, especially in primiparæ; placenta ablata, in which it is indicated to a marked degree; high fever of the mother, due to antepartum infection or other cause; placenta prævia, either to complete dilatation or to enable a foot to be brought down; premature delivery, in interest of mother or child. Those less enthusiastic would limit its indications to eclampsia where sypmtoms are very urgent; placenta ablata with marked symptoms; other serious condition of the mother making immediate delivery imperative for the maternal interests. Such would not advise its use in the interests of the child alone. The majority even of the advocates of Bossi's method either consider placenta prævia as the most debatable indication or even an absolute contraindication. The ground for the latter opinion is chiefly because the method does nothing for the inevitable hemorrhage, which goes on unchecked during the dilatation, and because the tissues of the cervix and lower uterine

segment are particularly friable when the placenta is attached low and the danger of lacerations is at a maximum. Some authors will make a rigid os an indication, while others are emphatic in stating that such an os contraindicates the use of the branching metallic dilators entirely.

Dilatation of the os and cervical canal by the classical manual method, namely, using the fingers and hand as a cone pushed up from below, should be practically discarded, because it is unphysiological, difficult, tiresome, and dangerous. The last reason depends upon the fact that the fingers being pushed into the canal are not in a position to feel accurately the condition of the muscular ring through which they are forced, and dangerous force may be employed inadvertently. The method is not fast enough for cases where haste is a large factor in the indications.

The manual method of Philander Harris is more physiological, and is more under the control of the feeling of the dilating fingers. Williams's results with it in his eighty-seven cases are certainly good enough to recommend it. The method presupposes that the finger can be passed through the os and that the hand can be passed into the vagina. If the former condition is not present, the dilatation can easily be started by the Hegar dilator or that of Goodell, or even by Bossi's, until enough dilatation has been obtained to allow of the introduction of the first finger. After that, dilatation will often be as easy and as quick as can safely be accomplished by any other method.

The bimanual dilatation, performed under proper precautions, with educated fingers, and without undue roughness or haste, is most useful for the great majority of cases where as quick a delivery as can safely be accomplished is demanded. As soon as Harris's method has obtained opening enough to let in two or three fingers, the opposing fingers of both hands can be used to obtain as rapid dilatation as is safe. The opposing fingers are always in the best position to know the amount of resistance and the strength of the muscles of the tissues being dilated. Thus, if any method allows of knowledge as to the safe progress of dilatation, this method certainly does. The fact that the hands and fingers are instruments always at the command of the obstetrician will render the manual methods of dilatation always favorites and always necessary to know. The student and the general practitioner must always be educated to work with the idea of safety rather than with the idea of speed. It is better to run the risk of a too slow labor than the more certain risks of traumatism, infection, and hemorrhage with methods which permit roughness to open the gate for haste. With the experienced and educated hand of the trained obstetrician, the bimanual method is as quick as any mechanical method which depends on force to dilate rigid tissues. With the inexpert, less harm is likely to be done with the fingers and hands, controlled directly by the nerves, than can be done by complicated instruments in the same inexperienced hands.

In the Champetier de Ribes bags or the Voorhees bags we have a method of fairly rapid dilatation which is as near the physiological as possible, and which is the least dangerous of any. The danger here comes only when undue haste and undue traction are employed. In cases where the bag can be used, and these are the vast majority of cases where rapid dilatation is indicated, haste and roughness can do as little harm as in any other method. In placenta prævia it is the method *par excellence*. It effects stoppage of the hemorrhage with the least danger to the child, stimulates the pains the most effectively and naturally, and dilates the cervix as rapidly as is necessary. If the bags are at hand, it will rarely be necessary, in cases of placenta prævia, to employ the manual methods, and almost never be justifiable to use any of the mechanical dilators. The all-essential is to stop the hemorrhage. After that, there is no hurry. Almost all the lacerations caused by the bimanual or manual methods are the result of too hasty extraction of the fœtus after version in placenta prævia. With the bags, version is seldom necessary. The bag compresses the lower segment to prevent the hemorrhage, and, when the full-sized one is delivered, the presenting part usually has come down far enough to take its place as a tampon, and the os is sufficiently dilated to allow the application of forceps or other obstetrical operation which may be indicated.

Even in eclampsia I think we often place too much stress on hasty delivery. The presence of the living fœtus in the uterus is not by any means the sole factor in the symptoms or in the danger. The modern rule in eclampsia is to deliver as quickly as is safe, not as quickly as is possible. Here again safety is of more importance than haste, and one should rather err in being too slow than in being dangerously quick.

Looking over the literature of the last few years, I conclude that the advocates of the branching metallic dilators, especially the Bossi type, have not made out a case. All the branching instruments are complicated and composed of a very large number of parts. All are dangerous as carriers of infection, because all are difficult to clean. Most of them depend for the dilating force upon a screw at the end of the instrument — usually eight or ten inches distant from the dilating tissues. Various rules are promulgated by various authorities about taking so and so many turns of the screw in so and so many minutes, waiting so and so long before screwing up again, and otherwise doing things by rote. The great fault of all is that the intelligence of the operator has to pass through so much mechanism before it reaches the tissues. It is impossible, at the end of a complicated instrument worked by a finely threaded screw, to have any adequate idea of how much force is being exercised upon the tissues of the os and cervix. Many authors state that the os must be tense, others that it must be loose. In reality, that excessively rigid os about which we hear so much and see so little is extremely rare. When it does exist, there is no method of the bloodless variety which can dilate it without great danger of serious lacerations. Here is the place for one of the bloody measures. The consistent and careful use of the bags, or, if more haste is demanded, the bimanual method, will overcome the other cases about as quickly as the Bossi method, and always more safely.

Bardeleben's examinations prove that far more lesions follow the method of Bossi than follow labors where that method is not employed. The large and growing number of authorities, especially in Germany, who are coming out from the glamour of Leopold's enthusiasm, and who are reporting failures with the Bossi method and serious lacerations following it, are continually furnishing more and more evidence against it.

BIBLIOGRAPHY

AHLFELD. Beiträge zur Geburtshülfe, vol. iv.

ARMSTRONG. British Medical Journal, 1904, i, p. 707.

BACON. Amer. Jour. of Obstet., 1903, p. 83.

BALLANTYNE. Jour. of Obstet. and Gyn. of the Brit. Emp., vol. vi, p. 36.

VON BARDELEBEN. Arch. für Gynäk., vol. lxx; vol. lxxiii, p. 187.

BARNES. Lancet, Jan., 1863.

BISCHOFF. Zentralblatt f. Gynäkologie, 1899, p. 1265.

BLAKER. Trans. London Obstet. Soc., vol. ii, p. 101.

BONNAIRE. Arch. de Tocologie, Oct., 1891. Presse médicale, Aôut, 1897.

BÖRMA. Nederland. Tiijschr. v. Geneeskunde, vol. ii, No. 2. (Ref. Frömmer, 1904.)

BOSSI. Gazzetta degli pedali, Milano, 1891. Ann. di ostet. et ginecologia, Dec., 1892. Arch. d'ostetrica et ginecologia, 1903, vol. x, p. 257. Varese, 1903. (Ref. Zent. f. Gynäkologie, 1905, p. 220.) Arch. Ital. di ginecologia, 1904, vol. vii, p. 197. Ann. Gyn. and Pediatrics, 1904, vol. xvii, p. 239. Berliner Klinik, 1905, 17, 1–20.

BRAUN, KARL. Zeitschrift d. k.k. Gesellschaft d. Aerzen zu Wien, 1851.

BÜRGER. Archiv. f. Gynäkologie, bd. lxxvii, h. 3.

CHAMPETIER DE RIBES. Ann. de Gynecologie, Dec., 1888, p. 401.

COCQ. Jour. médicale de Bruxelles, 1904, ix, p. 21.

CRISTOFOLETTI. Wiener klinischer Wochenschrift, 1903, p. 827.

DE LEE. American Gynecology, 1903, vol. ii, p. 357.

DICKENSON. American Gynecology, 1903, vol. ii, p. 354.

DÜHRSSEN. Archiv f. Gynäkologie, bd. lxxv, p. 247; bd. lxxviii, p. 376; bd. lxxix, p. 215.

DUKE. Medical Press and Circular, London, 1905, vol. lxxix, p. 262.

EDGAR. New York Medical Journal, Nov. and Dec., 1896.

EHRLICH. Archiv f. Gynäkologie, bd. lxxiii, p. 439.

VON FELLENBERG. Korrespondenzblatt f. Schweizer Aertze, 1904, No. 13.

FLINES. Nederland. Tiijschr. v. Geneeskunde, i, No. 5. (Ref. Frömmel, 1904.)

FOTHERGILL. Jour. of Obstet. and Gynec. of the Brit. Emp., 1904, vol. vi, p. 313.

FRÖMMER. Zentralblatt f. Gynäkologie, bd. xxviii, p. 1017.

GARDNER. Jour. of Obstet. and Gynec. of the Brit. Emp., 1903, p. 384.

GONNARD. Bulletin de la Soc. d'Obstet., Nos. 5–6, 1904, p. 253.

GREDER. Centralblatt f. Gynäkologie, 1887, No. 29.

GREKOW. Jour. akutsch. i jentsch., etc. (Ref. Zent. f. Gynäkologie, 1905, p. 210.)

GRÖNE. Hygeia, Stockholm, 1904, iv, p. 71.
HAHL. Arch. f. Gynäkologie, bd. lxxi, p. 504.
HAMMERSCHLAG. Zentralblatt f. Gynäkologie, 1905, p. 461.
HARRIS. Amer. Jour. of Obstetrics, vol. xxviii. Medical Record, 1904, vol. lxvi, p. 969.
HARTZ. Monattschrift f. Geburtshülfe u. Gynäkologie, 1904, bd. xix, p. 91.
HEIKEL. Arch. f. Gynäkologie, bd. lxxi, p. 522.
HENZE. Monattschr. f. Geburtshülfe u. Gynäkologie, 1903, p. 689.
HIGGINS. Annals of Gynecology and Pediatrics, 1904, p. 21.
HIRST. American Medicine, 1904, vol. vii, p. 886.
HOFMEIER. Ref. Zentralblatt f. Gynäkologie, 1904, p. 674.
KAISER. Ref. Zentralblatt f. Gynäkologie, 1904.
KATZ. Therapeutische Monattschrift, Sept., 1903.
KERR. British Medical Journal, 1904, vol. i, pp. 67, 707.
KNAPP. Monattsch. f. Geburtshülfe u. Gynäkologie, 1896, bd. iii. Prager med. Wochenschrift, 1903, No. 29. Illust. Monattschr. d. ärtzliche Polytech., Berlin, 1903, bd. xxv, p. 98. Verhandlungen der deutcsh. Ges. f. Gyn., bd. x, Würzburg, 1903.
KNAPP. Archiv f. Gynäkologie, bd. lxxvii, p. 321.
KÖNIG. Revue medicale de la Suisse romande. (Ref. Zent. f. Gyn., 1904, p. 221.)
KOUWER. Nederland. Tiijschr. v. Geneeskunde, Amsterdam, 1903, xxxix, p. 1040.
KRÖMER. Zentralblatt f. Gynäkologie, 1904, p. 601.
KRULL. Münchener medicinischer Wochenschrift, 1903, bd. i, p. 908.
LEOPOLD. Archiv f. Gynäkologie, bd. lxvi, p. 198.
LOTT. North Carolina Medical Journal, May, 1892. American Gynecology, 1903, vol. ii, p. 295.
MÄURER. Centralblatt f. Gynäkologie, 1887, No. 25.
MENDES DE LEON. Ref. Zentralblatt f. Gynäkologie, 1904, p. 1054.
MEULEMANN. Inaugural Dissertation, Amsterdam, 1903. (Ref. Zentral. f. Gyn., 1904, p. 1053.)
MEURER. Monattsch. f. Geburtshülfe u. Gynäkologie, 1903, bd. xvii, p. 1299.
MITROFANOW. Jour. akutsch. i jentsch., 1903. (Ref. Zentralb. f. Gyn., 1904.)
MUUS. Ref. Zentralblatt f. Gynäkologie, 1904, p. 1053.
NORRIS. American Medicine, 1905, vol. ix, p. 810.
OSTERLOH. Zentralblatt f. Gynäkologie, bd. xxvii, p. 72.
OSTREIL. Zentralblatt f. Gynäkologie, 1903, No. 11.
POLLAK. Chrobak's Festschrift, 1903, p. 36. Monatschr. f. Geburtshülfe u. Gynäkologie, 1904, bd. xx, p. 335. Annales de Gynécologie et d'Obstetrique, Paris, 1904, p. 660.
POMORSKI. Polnischer Monattsch. f. Geb. u. Gyn., bd. i, h. 1.
PREISS. Zentralblatt f. Gynäkologie, 1903, p. 329.
RICCI. Arch. ital. di ginecologia, 1904, p. 71.
RISSMANN. Zentralblatt f. Gynäkologie, 1902, p. 748. Russian Congress for Obstetrics and Gynecology. (Ref. Zentralb. f. Gyn., 1904, p. 490.)
SCHALLER. Würtemburger med. Korrespondenzblatt. (Ref. Zentralb. f. Gyn., 1904, p. 1056.)
SCHAUTA. Centralblatt f. gesammte Therapie, 1883.
SCHÜRMANN. Monattschr. f. Geburtshülfe u. Gynäkologie, bd. xviii, 1903, p. 513.
SCHWARZENBACH. Monattschr. f. Geburtshülfe u. Gynäkologie, bd. x, 1899, p. 768.
DE SEIGNEUX. Jour of Obstet. and Gynec. of the Brit. Emp., bd. lxx, 1904, vol. vi, p. 19. Archiv f. Gynäkologie, bd. lxx, p. 614.
SINCLAIR. Jour. of Obstet. and Gynec. of the Brit. Emp., 1905, vol. vii, p. 57.
SMITH. Trans. Royal Academy of Ireland, 1905, vol. xxiii, p. 223.
STOECKEL. Berliner klinischer Wochenschrift, 1905, bd. xlii, p. 302.
STRASSMANN. Archiv f. Gynäkologie, bd. lxvii, p. 113.
TARNIER. Gazette des hôpiteaux, 1862, No. 135.
VOORHEES. Medical Record, 1900, No. 59.
WALCHER. Illust. Monattsch. d. ärtzl. Polytech., Berlin, 1904, bd. xxvi, p. 19.
WILLIAMS. American Gynecology, 1903 p. 13.
WIRTZ. Monattsch. f. Geburtshülfe u. Gynäkologie, 1903, p. 396.
WOLFF. Zentralblatt f. Gynäkologie, 1904, p. 447.
WYDER. Winckel's Handbuch, etc.
ZANGENMEISTER. Zentralblatt f. Gynäkologie, bd. xxvii, p. 97.
ZINKE. Amer. Jour. of Obstet., 1904, vol. i, p. 653.

BLOODY METHODS OF RAPID DILATATION[1]

Cervical Incisions — Vaginal Cæsarean Section

By RUDOLPH WIESER HOLMES, M. D., Chicago
Assistant Professor of Obstetrics and Gynecology, Rush Medical College, in affiliation with the University of Chicago

THERE are two methods of the bloody dilatation of the os in advanced pregnancy — one, cervical incisions, which have been in vogue for over one hundred years; the other, vaginal Cæsarean section, which had its origin, in its perfected form, within the last decade. The profession is indebted to A. Dührssen of Berlin for the popularization of both, and very largely for the origin of the latter. Both have become most valued adjuncts to the means of rapid delivery. Sufficient time has now elapsed for one to make a critical review of this subject of the bloody dilatation, and particularly of the major operation, which has obtained many able advocates. Some of our great authorities have been carried too far by the fervor of their enthusiasm. The few who unequivocally condemn the procedure will find their position untenable. So, in the course of this paper, I shall endeavor to show that enthusiasm for a new operation has led some operators to perform vaginal Cæsarean sections for seemingly unwarranted indications. As a corollary to this, it will appear that incisions in the parturient tract will have a more limited sphere of usefulness than some would have us believe. The future alone may tell to what extent incisions will replace the bloodless methods of dilatation. Further, I shall attempt to show that while dilatation by incisions is one of the great fields of obstetrical surgery, it is not so bereft of dangers as its strongest exponents would have us believe. Preliminary to these I shall endeavor to clarify the mistiness caused by the discussions of priority, which at times have been unnecessarily acrimonious.

PRIORITY OF CERVICAL INCISIONS

Real discoveries are rare. Most often our advances have been made by means of gradual development. In certain instances, minds of the past have conceived the idea of new principles. As conditions were not suitable, the application of these principles was impossible; so they remained untried, or, at most, had a limited scope. At a later period, conditions may be ripe, and the demand imperative, so that what formerly was merely an idea becomes of signal value. Necessity determines a discovery anew, or perhaps broadens its application enormously. Thus we may observe that dilatation by incision — cervical incisions — was not evolved from the mind of one man in a night, but owes its development to the gradual fruition of previously conceived knowledge based on refined anatomical studies and modern clinical necessity. I think we all may see the trend of the bloody dilatation of the parturient os in the recommendations of Lauverjat (1) in the seventeenth century, of Coutouly (2) in 1808, and Morgagni (2), that, under certain circumstances, the cervix should be incised to admit delivery. Lauverjat is reputed to be the originator of the term "vaginal Cæsarean section," applying the term to cervical incisions. At the beginning of the nineteenth century, Baudelocque (3) strongly deprecated the practice of dividing the Cæsarean operation into abdominal and vaginal, "comprehending under this new denomination all operations performed on the neck of the uterus without affecting neighboring parts." In 1835, Dewees (4) showed that the claim of priority was vexing the profession. Moscati advised cervical incisions in cicatricial stenosis of the os, and, to quote Dewees, "Moscati appears to consider it original." Simpson (5) performed cervical hysterotomy for carcinoma cervicis. Bedford (6), in 1843, and again in 1847, saved the lives of two women, who had been hours in dystocic labor due to cervical rigidity, by boldly making bilateral incisions in the cervix, and then bisecting the posterior lip. In his first case the posterior cut was extended "to within a line of the peritoneal cavity." Depaul (7) and Hildebrandt (8) likewise lent their counsel to

[1] Read before the Chicago Gynecological Society, September 21, 1906.

the same purpose. To Karl Braun (2) clearly belongs the credit of priority for the modern opinions concerning cervical incisions, for he not only explicitly presented the indications, but, more important still, laid down the essential condition governing their employment. He demanded that there be at least effacement of the supravaginal portion of the cervix. The fact that the technique of the operation was not exact should not bar him from a high place in this regard. Skutsch (9) refined the knowledge still further. He recommended that there be six incisions, each being two centimeters long. Dührssen (10) contended that two or three incisions were sufficient, but in one instance he was compelled to make seven. Again, Dührssen (11), in 1890, perfected the technique, and enormously widened the indications. In 1901, Holmes (12) further modified the technique, which will be described under the appropriate caption. Here it is not amiss to condemn writers who credit Dührssen with all the honors of discovery, when he (13) most emphatically recedes from his earliest claim to priority, and maintains, with right, that to him belongs the credit of forcibly bringing the topic anew before the profession, more clearly refining the technique, and then too largely broadening the indications.

PRIORITY OF VAGINAL CÆSAREAN SECTION

How are we to consider the priority of the so-called vaginal Cæsarean section? Shall we hold that this operation is merely an adaptation of gynecological procedures to obstetrical conditions? or shall we maintain that the operation originated *de novo* from obstetrical necessity? If the former were employed, it would be easy to show the connection between anterior colpotomy, bisection of the anterior cervical and uterine walls for the removal of pedunculated fibroids, correction of uterine inversion by incision, or even vaginal hysterectomy with uterine bisection, and the new vaginal Cæsarean section. While I would discard this deduction for practical reasons, I nevertheless would impress upon you the fact that many an old principle is applied to new purposes. From this standpoint the new operation is not a new discovery. The underlying principle is there. Only another condition or indication is present — pregnancy. Starting on the convenient assumption that vaginal Cæsarean section was discovered in 1895, who would be the originator? Dührssen, who, in April, suggested the procedure in meager words? or Acconci, who first independently performed the operation? This matter is of apparent vital import to Dührssen, who so persistently demands the priority for himself in almost every contribution. Acconci, unfortunately, no longer may take up the lance in his own defense, but must needs have his posthumous friends defend his rights.

The facts: On April 1, 1895, Dührssen (14) published a paper on the treatment of eclampsia, in which he uses these words: "The specialist may effect the same [i. e., rapid dilatation] by means of sound dilatation, eventually by median incision of the anterior cervical wall and the lower uterine segment after preliminary opening of the anterior vaginal vault — by means of combined version, extraction, and manual placental separation: delivery may be consummated in one half hour." Upon this sentence, buried in a lengthy paper on eclampsia, and published in the *Allgemeine deutsche Arztezeitung*, a journal unknown to the librarian of the Surgeon-General's Library of the United States, and not found in the libraries of Chicago, Dührssen bases his claim to priority. On the 4th of July, 1895, Acconci (15), an Italian, operated upon a woman, seven months pregnant, with carcinoma cervicis. He cauterized with a Paquelin, made a circular colpotomy, opened the Douglas pouch, separated the bladder from the uterus, bisected the anterior and posterior cervical lips, and as there was not sufficient dilatation, employed Mauri's dilator, turned and delivered, and finally removed the uterus per vaginam after a manual removal of the placenta. Then Dührssen, on the 24th of April, 1896, performed his first operation, over a year after his first suggestion was made, and nine months after Acconci had operated. Dührssen (16) reported this case in his extensive monograph on vaginal Cæsarean section some three months later. Acconci (15) then, in October, 1896, presented his operation in an Italian *Annual* for 1894–95. Further, Acconci (17) sent a summary of this case, with some few comments,

to the *Monatsschrift*, where it was published in 1899. In correcting the proof, he adds a foot-note, that the manuscript was in Sänger's hands when he (Acconci) received Dührssen's monograph on vaginal Cæsarean section, published in the *Sammlung klin. Vorträge*, No. 232, December, 1898, which was the first intimation that another had suggested the same procedure. There is only one rational conclusion to make from these facts. Dührssen conceived the operation and made the first publication. Acconci likewise conceived the operation and was the first to carry out the details of vaginal Cæsarean section with a subsequent hysterectomy. In other words, he was the first to perform a radical Cæsarean section. Therefore the only right deduction to make is that *each independently applied old principles to new indications, and both are equally entitled to full credit.* For Dührssen to maintain that Acconci did not get the right idea, as he (Acconci) used a metal dilator in his technique, places Dührssen in an anomalous position, for he advised "sound dilatation" as a precursor to incisions. If perfection of technique were the gauge of priority, then Bumm (18) and Rühl (19) would be in a position to claim this dubious honor. Incidentally, Rühl (19) claims precedence, as he did his "anterior uterovaginal cut" on November 1, 1895, nearly five months previous to Dührssen's first case.

THE CONDITIONS

The factors which permit cervical incisions are in sharp contrast to the limitations placed for vaginal Cæsarean section. The former are physiologic and anatomic; the latter are mainly artificial. Therefore much depends upon the personal bias of the operator. The application of cervical incisions presupposes labor for a more or less protracted period. Vaginal Cæsarean section is pre-eminently an elective procedure in pregnancy and labor.

All the conditions I would lay down cover more or less closely the use of cervical incisions. The first two only need concern the operator in a vaginal Cæsarean section. The conditions are: 1. Cephalopelvic relation; 2. Mobility of the uterus; 3. Engagement; 4. Effacement. Supplemental to these are the special conditions controlling the several operations of delivery.

1. *Cephalopelvic Relation.* The necessity for the observance of this condition is as patent here as it is in all other methods of delivery through the parturient tract. Dührssen (20) argues that in contracted pelves of mino degree the obstruction is dependent, not so much on the pelvic disproportion as on the resistances of the soft parts; therefore, to deliver, he would in appropriate cases employ cervical incisions. His remarks apply to the Cæsarean section likewise. This may be true to an extent. Webster (21) had a most difficult extraction, which could be accomplished only by forceps on the after-coming head with a dead baby. Thorn (22) had to do a craniotomy. Dührssen (23) places a conjugata vera of eight centimeters as the lowest limit for a vaginal Cæsarean section, but this, surely, is too low.

2. *Mobility of the Uterus.* The technique of vaginal Cæsarean section may be seriously jeopardized by pathological states which fix the uterus, as inflammatory exudates, carcinoma, etc. A contracted pelvis may prevent the uterus being drawn down, as, also, it will reduce the room for work to such an extent that the operation may be technically very difficult. The fixation of the uterus may actively interfere during the cutting period as well as that of repair. Kerr (24) had such a case, where it was impossible to pull down the lower segment. The writer, likewise, operated upon a woman in whom it was found impossible to draw down the lower segment, even after the uterus was completely emptied. This made the operation technically very difficult. This condition is of minor importance in doing cervical incisions.

3. *Engagement.* The writer is in accord with Wyder (25), who asserts that there must be engagement of the presenting part for the case to be appropriate for cervical incisions. As the indication for the operation generally occurs late in labor, and often after the membranes have ruptured, the time for version is often gone, so engagement is needed for the forceps operation. This limitation does not concern vaginal Cæsarean section. In fact, version is the operation of election in this procedure; so a movable head is to be desired, both to facilitate the turning and

to render the section more easy of consummation.

4. *Cervical Effacement.* As already stated, Karl Braun (2) clearly laid down the fundamental anatomical condition which renders the employment of cervical incisions permissible. Since his limitation was placed in 1881, or even earlier, no advance in this regard has been presented by later exponents of the operation. It is needless at this time to enter into a dissertation on the physiological behavior of the cervix and lower segment in labor; here we may simply state that cervical incisions are particularly appropriate in primiparæ, for effacement generally occurs before dilatation; however, certain of the essential indications may so alter the cervix of multiparæ that the operation in such cases is feasible and proper. It should be borne in mind that judicious hystereurysis may artificially produce this condition when haste is not requisite. This condition, in a measure, determines the type of operation — effacement present, incisions; absent vaginal Cæsarean section if immediate delivery is demanded.

INDICATIONS

At the time of writing my previous paper (26) on cervical incisions some three years ago, I received the impression that the operation was considered by some, particularly by Dührssen, as a panacea for all obstetrical ills, provided the woman had reached that stage of labor characterized by cervical effacement. Since the adoption of the more radical vaginal Cæsarean section, the surprising fact is ascertained that it has superseded the more conservative operation of incisions. The valiant defenders of the latter have transferred their allegiance to the more spectacular and dangerous procedure, and with greater zeal combat the arguments of those who still advocate the more conservative and oftentimes more rational manual or bag dilatation. The cervical incisions have not received quite the adequate recognition during the past five years that their limited sphere of usefulness warrants.

We cannot too strongly deprecate the enthusiasm of those who maintain that there is only one method of rapid dilatation of the os. As all roads supposedly lead to Rome, so bag-therapy, manual dilatation, Bossi or other instrumental measures, cervical incisions, and, finally, vaginal Cæsarean section, all have their due place in our operative preparation of the parturient os for delivery. It is the writer's firm conviction that these various methods do not necessarily come into direct concurrence with one another; rather, they are complemental. One necessarily must consider the anatomical conditions, the dangers to the mother, both from the indications which demand an accelerated delivery and the method which is to give her succor. The writer is very glad to recognize, with Pozzi, that vaginal Cæsarean section is the great surgical achievement of the nineteenth century, and to accord to Dührssen the highest honor for his indefatigable labors in placing the operation before the profession; but because these facts are recognized, one should not let his admiration for the operation make him oblivious to the other fact, that the operation is yet in an experimental stage as regards certain indications; that most certainly many cases were subjected to the new procedure when more conservative manipulations would have produced as happy results without placing the two patients in jeopardy.

In the paper already referred to, I placed the indications for incisions in two categories, which classification is applicable to the new vaginal Cæsarean section as to cervical incisions: (*a*) *Essential indications* — various forms of cervical rigidity; (*b*) *Contributory indications* — complications of labor. Naturally, the latter, *per se*, merely indicate the necessity of a forced delivery; the former will determine more closely the type of operation. If the woman is so unfortunately placed as to have a double indication — an essential and a contributory indication, as eclampsia or a heart lesion with a rigid cervix — there may be no question but that vaginal Cæsarean section or cervical incisions are clearly indicated. I firmly believe that it is still a mooted question at to the necessity of justification of such a portentous operation as vaginal Cæsarean section in purely contributory indications. Further, in the absence of urgent symptoms it is more scientific to endeavor to secure dilatation by less harmful methods, as hysterauxesis, before proceeding to the major cutting operation.

ESSENTIAL INDICATIONS — VARIOUS FORMS OF CERVICAL RIGIDITY

For the purpose of practical clinical work, cervical rigidity may be divided into groups. The classification, although largely arbitrary, and therefore artificial, is a useful guide.

(*a*) *Simple Rigidity*, which would comprise the so-called conglutinatio orificii externi, atresia of the os, rigidity accompanying cervical hypertrophy, congenital and inflammatory rigidity, and the cicatricial contractions due to escharotics.

(*b*) *Rigidity Due to Scars*, as after trachelorrhaphies and cervical amputations. To these may be appropriately added scars the result of previous labors, especially where a puerperal infection followed the lacerations.

(*c*) *Faulty Dilatation*, due to aberrant mechanisms of labor, as in abnormal positions and presentations, premature rupture of the membranes, oligohydramnios.

(*d*) *Cervical Displacements*, due to various operations for the correction of faulty uterine positions, or the actual incarceration of the pregnant retroflexed uterus; tumors of or in the pelvis.

(*e*) *Carcinoma — Fibroids* of the lower uterine segment.

As the pathological states included in (*a*) and (*b*) are somewhat cognate, they may be treated collectively. The writer is firmly convinced that true cervical rigidity is relatively rare; i. e., if those cervices which are denominated rigid, but which are solely due to the ineffective action of labor, were eliminated, true rigidity would be rarely found. It is perfectly obvious that a closed os with uneffaced cervix will not respond so readily to artificial methods of dilatation as when early labor has produced the usual physiological changes. Only too often rigidity may not be recognized until careful, judicious attempts at artificial dilatation have been proven futile. Conservatism accomplishes much. Uncomplicated cervical rigidity, *per se*, is not an early indication for the use of the knife. Rather, one should practise watchful expectancy, of which Schroeder spoke so much, and which to-day is too rarely employed, aided by the rubber bags, before one resorts to incisions. On the other hand, there can be no question but that a timely use of the knife or scissors is infinitely less dangerous than brutal and violent means of overcoming cervical resistance which ends in rupture. To be brief, then, incisions are limited to effaced cervices; that is, in cases in which the failure of dilatation lies in the infravaginal portion of the cervix. This implies that labor has been in progress for some time. Rigidity which has affected the supravaginal cervix most certainly should preclude the use of mere incisions, but demands the vaginal Cæsarean section. Rigidity, *per se*, has seldom called for vaginal Cæsarean section if the records of Dührssen (27) are to be relied on. Nearly all instances had an accompanying contributory indication. Braun (28) reported a case of cicatricial contraction of the cervix and vaginal tissues, the result of typhus. Spinelli-Donadoni (29), Bumm (18), and Simon (30) have presented examples of cervical rigidity in multiparæ, requiring vaginal Cæsarean section. Rühl (31) operated on a primipara who had been in labor five days — tetany was present, the cervix being very rigid. Ehrendörfer (32) had a tuberculous patient with a hypertrophied cervix. Baccus (33) and Simon (30) applied the operation to cases of rigidity, the result of cervical amputation.

(*c*) *Faulty Dilatation.* It is common experience that dilatation of the os may not progress normally in women with abnormal positions, in premature rupture of the membranes, oligohydramnios, and finally in contracted pelves. The interference with normal dilatation by these various factors has been too often ascribed to a cervical rigidity, but is due to faulty interpretation of conditions present. Properly, the cervices have not received the full influence of labor. Most certainly the hystereurynter is the proper contrivance in the absence of pressing contributory indications. With these present, the incisions may take an appropriate place.

It is not amiss here to mention the relation of the soft parts and contracted pelves and dystocia. As already mentioned, Dührssen (20 and 23) maintains that in minor degrees of pelvic contraction the resistance is not due so much to the pelvic distortion as to the soft parts. It was in the days of cervical incisions that he enunciated this *dictum*. To-day,

vaginal Cæsarean sections are not being done for contracted pelves. We are firmly convinced that the time is far distant before the profession generally will have the temerity to do a pubiotomy and then a vaginal Cæsarean section for contracted pelves, as Dührssen (34) advises. The problem of the century does not lie in the combination of these two operations, which have not received the unqualified approval of all the obstetrical profession, especially the former, pubiotomy, which as yet is a local operation limited to a few clinics. The problem of the future is to have a correct diagnosis of pelvic deformity made before labor, to have the technique so developed that the errors and accidents incident to abdominal Cæsarean section may be eliminated. The amount of mutilation accompanying the two procedures will forever preclude them from taking the place of the classic Cæsarean section as elective measures.

(*d*) *Cervical Displacements.* *a.* Dystocia the Result of Operations for the Correction of Uterine Displacements. Obstericians generally have had occasion to observe instances of marked dystocia the result of uterine fixations. The most frequent causes of such dystocia are utero-abdominal fixations and suspensions. Likewise, vaginal fixations may produce more or less serious dystocia. So far as the writer is able to find, vaginal Cæsarean section has not been done for abdominal operations. It has been limited to cervical displacements the result of vaginal fixations. Rühl (35) was the first to perform an anterior vaginal hysterotomy for this condition. He made the vaginal fixation in 1894, and on November 1, 1895, he was forced to do the vaginal Cæsarean section on account of the high posterior position of the cervix. Since then he has performed the same operation on two other women (36). Regnoli (37) had a patient with a similar condition, the result of an artificial os being placed in the anterior uterine wall. The writer is convinced that the most practical treatment of dystocia the sequence of a ventral operation is to perform the abdominal Cæsarean section, with a separation of the adhesions and the proper care of the denuded surfaces.

b. Incarcerated Retroflexed Pregnant Uterus. One case — that of Bennecke (38) — has been reported. The report of the case in epitome is enough for the purpose of criticism. At the beginning of September, cessation of menstruation. October 6th, had chills and diarrhœa. On account of sacral pain, an examination was made. A retroversion was found, which was corrected, and a pessary introduced. In the middle of November, signs of collapse appeared. On account of severe pains, the pessary was removed. On November 21st, a substance the size of a pigeon's egg came away. The vagina and the cervix were tamponed on December 8th. The tampon had no effect. Thereupon he did a vaginal Cæsarean section, on a woman a little over three months pregnant. He could not correct the uterus; he could not even clean out the uterus with a posterior incision, but must needs make an extensive anterior incision (incidentally opening the bladder), and removed a fœtus so badly macerated and a placenta so degenerated that they could not be differentiated. We wonder how a three months' uterus could fall back into the pelvis, much less one of four and a half months' duration, as he will have the period of pregnancy. The case of Wennerstrom (39) cannot be denominated a vaginal Cæsarean section, as he punctured the posterior uterine wall after having made a posterior colpotomy.

c. Tumors in the Pelvis. Up to the present writing, no operator has removed pelvic tumors (cysts, etc.) by the vaginal route with a secondary vaginal Cæsarean section. Petersen (40) reported a case of ovarian cyst complicating labor, in which he removed the tumor, then made lateral incisions into the parametria, which gave rise to much discussion before the Middle Rheinisch Obstetric and Gynecologic Society; the consensus of opinion of those who discussed the paper being that an abdominal attack was preferable, Sippel going so far as to say "that a vaginal procedure was a leap in the dark."

(*e*) *Carcinoma.* From the time Acconci first operated for carcinoma cervicis in pregnancy, writers have accepted the same limitation to the radical vaginal Cæsarean section as in the case of hysterectomy in the non-pregnant state. The one restriction is that the case shall be *operable*. The accumulated knowledge of carcinoma cervicis, as in carcinomas else-

where, is, that operability is not dependent alone on local evidences of the malign growth, but also on its metastases along lymph-channels. If effective operations may be done only by a systematic removal of all regional lymph-glands, then vaginal Cæsarean section should alone be considered as a means of bringing a viable, living child into the world. It in no manner may be considered as a really therapeutic measure for the mother. If, however, operability be considered as alone dependent upon a sharp localization in the cervix, then the advantage is twofold, in that the child may be brought into the world, and the future of the woman in a proportion of the cases may be guaranteed. Orthman (41) lays particular stress on the location of the cancer. If the carcinoma is limited to the portio vaginalis, the immediate and remote results of the operation are best, as is the case in non-pregnant women. So soon as the supravaginal portion is involved, the outlook is exceedingly grave. In his three cases of portio carcinoma, none died, while of four more extensive growths, three died. May we expect that women afflicted with carcinoma in pregnancy will be no more jeopardized than when the malignant growth occurs in the non-pregnant state? Wertheim (42) probably voices the consensus of opinion when he declares pregnancy has a malign influence on uterine cancer. *A priori*, one would expect that operative intervention of cancer in pregnancy would be more serious in its immediate and remote consequences than in the non-pregnant state. Dührssen's (27) statistics of forty-five cases of carcinoma treated by vaginal Cæsarean section, followed by vaginal hysterectomy (the so-called radical vaginal Cæsarean section), resulted in five deaths — 11.1 per cent mortality. However, Joedicke (43), in 1903, was able to find 27 cases, with 6 deaths — 22.2 per cent mortality — this, two or three years before Dührssen's paper appeared in Winckel's *Handbuch*. The case of Zweifel — case 223 in Dührssen's study — is omitted, as it was a vaginal Cæsarean section in which forceps could not pull down the head. To save the child, an abdominal Cæsarean section was done, which, fortunately, resulted favorably for both mother and child. Of Dührssen's thirty-one cases of advanced pregnancy, the mortality was sixteen per cent. No mother died when the operation was done in the sixth month or earlier. However, of eleven cases in the eighth and ninth months, no mothers died. Of the twenty-nine children of advanced pregnancy (seventh, eighth, ninth, and tenth months), where the result is given, fourteen remained alive — a mortality of 51.7 per cent. As an antithesis to these figures, I quote Winter (44), who presents sixty-six cases operated on in the non-pregnant state, after the method of Freund, by Küstner, Freund, Schauta, and himself, with sixteen deaths — 24.2 per cent mortality. In 993 cases of vaginal extirpation, there was a mortality of 7.1 per cent.

Fortunately, carcinoma is very rarely a complication of pregnancy. It would seem scientifically correct to demand an immediate vaginal section if the case is *operable*, without regard for the child. If this question of operability is debatable, or if the cancer has involved the supravaginal cervix, and particularly if it has encroached into the parametrium, then palliative treatment is in order, awaiting advanced pregnancy if possible. Then, on account of the great liability of hemorrhage from lacerated surfaces, and injuries to adjacent organs, the vaginal route should be discarded for the abdominal Cæsarean section.

Fibroids. So far as is known to the writer, no operator has combined the removal of fibroids of the lower uterine segment and the vaginal Cæsarean section. Dührssen (27) describes and depicts the case of Kaltenbach in which he (Kaltenbach) did a Porro for a large pedunculated fibroid blocking the pelvis. Two small fibroids were found on the fundus, as well as three tumors situated on the posterior wall above the one causing the dystocia. Dührssen declares that the case could be safely treated in this wise: The posterior vaginal wall, which had been pushed downward by the pedunculated myoma, is sagittally incised, and the cut extended up to the lower of the three interstitial tumors. By morcellation the large fibroid is removed and its pedicle ligated. Thereupon the lower myoma may be removed, and the uterine incision may be extended. The uterus is then emptied. By prolongation of the incision the higher tumors on the pos-

terior wall may be removed. The fundus now may be extracted through the enlarged wound, and the two fundal tumors removed and their pedicles cared for. Thereupon the fundus may be returned and all the incisions closed. We wonder who will have the temerity to remove per vaginam such a multitude of tumors extending from the lower segment to the fundus, combined with a vaginal Cæsarean section. We wonder who will have that remarkable diagnostic acumen to recognize such extensive fibrosis in the posterior uterine wall in advanced pregnancy. The plan adopted by Kaltenbach unquestionably was dictated by sound judgment. We fear Dührssen's extensive description of this beautiful hypothetical technique is merely to give him occasion to claim priority for another indication, in the event of some operator joining a vaginal enucleation of a fibroid with vaginal Cæsarean section.

CONTRIBUTORY INDICATIONS — COMPLICATIONS OF LABOR

The contributory indications are of two classes — maternal and fœtal. The various obstetrical complications of maternal origin which have been more or less accepted as indications for vaginal Cæsarean section will generally place the fœtus in jeopardy, so, usually, there will be a double necessity for active operative interference. To what extent one is entitled to go in endeavoring to save the life of an unborn child without a concomitant maternal indication is still a moot question, and will remain such until major obstetrical procedures have been robbed of most of their maternal dangers. While every means should be employed to rescue the child, it is a sad success which sacrifices the mother to its life, when conservatism will vouchsafe her life, even at the expense of fœtal life. In certain grave diseases, as eclampsia, placenta prævia, ablatio placentæ, etc., it is generally believed that the dangers of operative intervention are less than the awaiting of spontaneous evacuation of the uterus. Obstetrical art is the lesser of two evils. The future alone may tell which method of forced delivery is best — not for all necessities, but for each of the many complications demanding artificial aid.

MATERNAL INDICATIONS

(*a*) *Eclampsia.* The present trend of obstetrical teaching in the treatment of eclampsia is towards operative, immediate delivery. There is no question but that Dührssen (45) has truth in the statement, "They [women in eclampsia] die of the combination of a severe illness and the injuries produced." The possibility of nullifying such possible injuries is the aspiration of all obstetrical surgeons. The method which brings this Utopian result has not yet been presented to the profession. Sufficient evidence has not been adduced to show that vaginal Cæsarean section offers less shock, produces less lethal traumatism, than the other approved methods of rapid delivery in eclampsia, as manual dilatation and Bossi instrumentation. At the present time no one has the slightest authority, based on statistical study, or other means of reputable deduction, to declare that the vaginal Cæsarean section gives more happy results than the other methods. To say the least, it is begging the question to maintain that any operative delivery is a panacea for eclampsia. The ultimate, rational cure will come from a recognition of the essential poison and the production of a specific antidote, not from mere professional manual dexterity.

For the purpose of comparing methods, I have used the cases compiled by Dührssen in his monograph in Winckel's *Handbuch* (27). As he has indiscriminately summed up the cases of Rühl (15 cases), "from America" (15 cases), Bumm (37 cases), and Krönig (14 cases), without any regard for indication, it is impossible to use them for statistical purposes on the eclampsia question. So, of 85 cases reported in epitome, I find 49 patients with eclampsia. There were 11 deaths among 49 women — 22.4 per cent. If we add Veit's 33 cases, with 1 death, we have 82 cases, with a mortality of 13.4 per cent. Of the 50 babies (2 were twins), there were 22 deaths, 8 died soon after delivery, 16 recovered, and in 4 the result was not stated; therefore, of 46 infants there was an immediate mortality of 47.8 per cent, and an ultimate mortality of 65.2 per cent. This in eclampsia from the sixth month to term. Dührssen (45) criticises Bossi in these terms: "I showed that his results were

nothing extraordinary, since, in a total of 24 viable children, 9 (37.5 per cent) died as the result of the Bossi method. . . . In my record of women confined by obsolete operative procedures and without the Bossi method, the percentage was 23.75 per cent."

What is the difference between vaginal Cæsarean section with a maternal mortality of 22.4 per cent and obsolete methods with 23.75 per cent? The difference is so trivial that it is merely accidental. As regards the baby: that we may be eminently fair, I will consider that a baby is viable only at seven months. Then there were 40 infants to be considered, with 17 deaths — 42.5 per cent mortality; or with the 8 which later succumbed, an ultimate mortality of 62.5 per cent. To be still more fair, I will assume that a baby from an eclamptic mother is viable only after the eighth month. Now, there are only 31 cases, with 10 deaths — a mortality of 32.5 per cent. As 5 died subsequently, there is a total of 15 deaths of 31 cases in or beyond the eighth month — 48.3 per cent. Again, may I ask what is the advantage of vaginal Cæsarean section with a fœtal mortality of 62.5 per cent (vel 48.3 per cent), when Bossi's method *kills* only 37.5 per cent?

Now, I would be distinctly understood as believing in only a relative value of statistics — they do show something, however small their worth may be. In presenting these figures I merely wish to demonstrate that Dührssen has no justification in his reiterated statements that vaginal Cæsarean section is the only safe method of relieving eclamptics. As for Veit having three per cent mortality in his cases of eclamplsia treated by vaginal Cæsarean section, that is only an accidental circumstance. Cragin (46), in one year, had such a mortality in 31 cases of eclampsia; the next year he lost 45 per cent of 20 cases. I might quote Stroganoff (47), who had 113 eclamptics, with a gross mortality of 5.5 per cent, 3 dying from pneumonia, 1 from sepsis, and 2 were moribund at the time treatment was instituted. This without vaginal Cæsarean section. To quote Esch (48): From September 1, 1904, to January 1, 1906, there were 101 eclamptics in the Olshausen Clinic. Twenty died — 19.8 per cent. Of this number, 12 were delivered by vaginal Cæsarean section, with a mortality of 25 per cent.

I have not gone into the relative merits of other operative procedures for eclampsia — that does not fall within the scope of this paper — but I would make these concluding statements: All forced deliveries are inimical to the mother. As far as one may now ascertain, the different methods, in the hands of experts, offer relatively the same results, and probably produce approximately the same proportion of injuries. The lethal factor lies in the grave toxæmia, and to a slight extent in the operative delivery.

(*b*) *Placenta Prævia.* The two cardinal principles in the treatment of placenta prævia are, that the hemorrhage shall be stopped at the earliest possible moment, and that the delivery shall be as slowly consummated as is consistent with the welfare of the mother, and incidentally that of the child.

The hemorrhage may be controlled by three methods — the tampon, the hystereurynter, and Hicks's version. It is self-evident that, during vaginal hysterotomy, the hemorrhage may not be controlled. The few operators who have employed the operation for this indication have minimized the danger from this source. They were fortunate if their enthusiasm did not mislead them, but it will not always be so. I have heard of the case of a prominent and skillful operator who essayed the operation and had an uncontrollable hemorrhage, which accident will be repeated by others who risk the lives of their patients by this procedure. It is the common experience of all who have treated placenta prævias, that there may be disconcerting hemorrhages dur- ng vaginal manipulations, even during examinations. To have such cases, and then, besides, to expose sinuses by incisions, will aggravate the hemorrhage. In the second place, to extract the fœtus rapidly, the woman being anæmic, will surely produce shock to such a degree that the woman will be placed in sore jeopardy, if not be the direct cause of death. To control the bleeding by version, and then to combat the anæmia while nature is expelling the fœtus, will minimize this danger. With all the advances of modern surgery, I have already shown (49) that with the decline of the

death-rate in placenta prævia, due to improved technique, there has been a corresponding diminution of the mortality from infection, but the ratio between the two — hemorrhage and infection — remains approximately the same — two to one — as causes of maternal death. Vaginal Cæsarean section cannot alter this, for infection is largely due to the hands that first examine the case, as midwives, etc. In this paper (49), "Cæsarean Section for Placenta Prævia an Improper Procedure," I gathered the statistics of such men as Behm, Stratz, Fry, Drejer, Koblanck, De Lee, etc., with the result that in 1,029 cases of placenta prævia the gross mortality was only 3.3 per cent. Vaginal Cæsarean section, with its vaunted mortality of 12.7 (Dührssen, 45), without regard for indication, will offer no inducement to the thinking obstetrician. The one excuse for employing vaginal Cæsarean section for placenta prævia is, presumably, that there may be a "rigid os." In the paper referred to, I was able to show that one of the rarest obstetrical anomalies of placenta prævia was a rigid os — not one in 606 cases.

The most valuable commentary on the new operation for placenta prævia is Dührssen's (50) own case of this kind. A woman menstruated at the end of September; had irregular hemorrhages from November 10th; November 23d, the physician placed a laminaria tent in the uterus; on the 25th, a strip of gauze was introduced; and on the 27th, again a laminaria tent was inserted. January 30th, Dührssen sees the patient for the first time, and he puts a strip of gauze five meters long and a handbreadth in width in the uterus, and a laminaria tent in the cervix. And yet when the gauze and tent were removed the os was not "durchgängig" (patulous). On February 3d he finds he cannot insert his finger, so he does a vaginal Cæsarean section on a woman whose os will not admit the finger, but will allow the insertion of five meters of gauze and a tent. Steffick (51) well calls the operation a citizen-doctor incision. Then we have the case of Henkel (52). A woman in the hospital, awaiting Cæsarean section, suddenly has a hemorrhage. Here, confronted with a hemorrhage in a woman with a conjugata vera of 7.5–8 cm., he discards a typical Cæsarean section because it has not been successful enough; so he does a pubiotomy with vaginal section. He states that it took thirteen minutes (!!!) to complete the operation, including suturing the uterus. He very properly contends that abdominal Cæsarean section for placenta prævia has not been successful enough. This is true, as I have already shown in my paper, previously referred to, that the procedure for this indication has a maternal mortality of twenty per cent. Yet he elects vaginal Cæsarean section, which I find has a mortality of 16.6 per cent (1 death in 6 cases) in placenta prævia, and adds thereto the dangers of pubiotomy, which, under the most favorable circumstance, is seriously decried by many able obstetricians. It would seem questionable judgment to perform two operations whose dangers are not fully known, when one would have answered the purpose. A Porro in this case would have been beset with less potential dangers than the methods employed, for, up to May 20, 1905, no death has been reported for placenta prævia treated by abdominal hysterectomy, although there were only five such cases. I am convinced that the results in vaginal section for placenta prævia will be as bad as or worse than the typical operation for this condition — and more babies will be destroyed.

(*c*) *Ablatio Placentæ — Premature Detachment of the Normally Situated Placenta.* "In premature separation of a normally situated placenta, vaginal Cæsarean section is, as every one knows, the recognized operation," says Dührssen (34). This has not been proven. Any one who has had the misfortune to have an ablatio placentæ may easily imagine the prohibitive difficulties in carrying out the technique with the field of operation bathed with an uncontrollable stream of old and fresh blood. As Goodell (54) pointed out, the cervix is generally soft, due to the state of collapse and the *vis à tergo* of an excessive distention. Manual dilatation is easily consummated. Manual dilatation needs no ocular aid. A clear field is indispensable in vaginal Cæsarean section. In nine cases of ablatio, the writer has not seen a case in which it was not possible to dilate and deliver easily, safely, and expeditiously. If ablatio is complicated by a rigid cervix, then it is more than probable that good

results will follow an abdominal section. Rühl (55), Regnoli (56), Everke (27), and Miller (57) have reported cases without particularly startling results or deductions. Kerr (24) believes the operation may be of value for this indication.

(*d*) *Other Dangerous Maternal Complications.* To discuss these complications *in extenso* would be to enter too large a field. The personal bias of the operator enters largely here. For example, Dührssen (58) operated on a woman moribund with heart disease (mitral stenosis), Webster (59) for a double mitral murmur with acute pyelonephrosis, Bumm (18) and Everke (27) for chorea gravidarum, Rühl (60) for peritonitis with adhesions between the uterus and intestines, Dührssen (61) for threatened rupture, and Spinelli-Donadoni (29) for pernicious vomiting of pregnancy. These indications may well be understood. As for Everke (27) operating for uterine colic, and Zietschmann (62) having two operations for psychoses, it requires some imagination to picture the clinical necessity of major procedures.

FŒTAL INDICATIONS

Thus far the writer has been able to find but one instance of vaginal Cæsarean section performed for a fœtal indication — a prolapse of the cord with cervix uneffaced, operated on by Bumm (27, p. 597), with a happy result for mother and child. It would seem that the field is extended inordinately to place fœtal life on an equality with that of the mother by subjecting her to an operation of such magnitude for such a purely fœtal indication as a prolapsed cord. To be rational, it should be presupposed that the fœtus should not be in great immediate jeopardy at the time of operation, as must be the case with funic prolapse. For those who demand that delivery on the moribund be carried out, there may be no question but that the vaginal operation will secure more ready consent than the abdominal. That the outcome for the fœtus will be as good by the former as by the latter may be easily disputed.

TECHNIQUE

CERVICAL INCISIONS

It is presupposed that all accessories necessary for an aseptic conduct of labor are at hand. Assistants are essential for a proper technique, although some consider they are not indispensable. No obstetrical operation can be *rightly* conducted without assistants, any more than a surgical procedure can be, for the complications which may arise post-partum, as well as intra-partum, demand trained help.

The vagina is opened with broad retractors; the cervix is caught with vulsella on either side of the point of incision; under guidance of the finger placed between the head and cervix, a pair of scissors (preferably bent at the "knee") are inserted; one or two cuts are needed to carry the incision to the vaginal juncture; a posterior incision is made first, then on the sides, and the anterior incision last, although this detail may be varied for the individual case.

The incisions may be made more quickly by passing the index finger within the cervical canal, the middle finger without — this fixes the cervix — while making the posterior incision; the left cut may be made in like manner; the right incision conveniently requires that the middle finger be within and the index without the cervix; finally, without changing the relation of the fingers to the cervix, the anterior is made. If the cervix is yielding, vulsella are necessary. Dührssen (64) and Zweifel (65) advise this method.

In my paper on ablatio placentæ (12), presented to this Society, and later (26) more extensively described, I incidentally recommended making oblique incisions in the cervix instead of the usual quadrantial ones, for these reasons. If the cuts extend by tearing, there is less likelihood of the uterine arteries being implicated. Cuts or tears in the cervix heal better when oblique than when lateral. Schauta (66) has shown that friction interferes with wound-healing when the tears are lateral. If oblique, the denuded surfaces are kept in apposition by a splint action of the pelvic walls, as Schauta suggested.

Immediately after the incisions are made, the child should be extracted, either by version (if the operator denies the necessity of the fixation of the head as a condition), or preferably by forceps. If there is no hemorrhage, the spontaneous expulsion of the placenta may be awaited. If necessary, it may be removed

manually. The post-partum management includes careful digital and ocular examination of the parturient tract; if there is no bleeding, if the incisions have not extended beyond the vaginal vault by tearing, it is optional whether sutures be used or not. Dührssen (11) and Wyder (25) deprecate placing sutures; the latter because it is unnecessary to control the slight bleeding, and because it prolongs the narcosis unnecessarily. Dührssen maintains that the unsutured wounds heal as perfectly as those in which sutures are applied. In the event of hemorrhage of moment, which occasionally occurs, two procedures are open to the operator — one to repair, which should be done only if the upper angles of the wound may certainly be reached; the other, to introduce the uterovaginal tampon, which should be the procedure of election if the case is urgent.

VAGINAL CÆSAREAN SECTION

Vaginal Cæsarean section permits of various deviations from the technique offered by Dührssen. The variations are dependent upon the inclination of the operator, upon the indication for the operation, and upon the period of pregnancy and labor.

The steps of the operation may be rendered in epitome, thus:

1. Overcome the resistance of the pelvic floor: (*a*) Schuchardt-Dührssen procedures; (*b*) Manual dilatation of the vaginal orifice.
2. With or without instrumental dilatation of the os.
3. (*a*) Anterior colpotomy; (*b*) Posterior colopotomy; (*c*) Combined anterior and posterior colpotomy. The method is dependent upon the plan or procedure elected for the next step.
4. Trachelotomy: (*a*) Anterior incision; (*b*) Posterior incision; (*c*) Combined anterior and posterior incision.
5. Delivery of child: (*a*) Version, preferably; (*b*) Forceps; (*c*) Craniotomy, if the child is dead.
6. Delivery of placenta: (*a*) Manual removal; (*b*) Await spontaneous expulsion; (*c*) Credé.
7. The repair.
8. Prophylactic use of the tampon.

Radical Vaginal Cæsarean Section. (*A Post-partum Vaginal Hysterectomy*)

Preliminary — Assistants; armamentarium.

Assistants. As this operation is pre-eminently a major one, it should be done only in a hospital with a full quota of assistants — an anæsthetizer, two directly to assist, and one to handle instruments, sutures, sponges, etc. In view of the fact that Rühl (27, p. 582) has operated with the sole assistance of a midwife, this number of assistants seems superfluous, but no surgical operation of even minor magnitude can be conducted alone, let alone a major procedure which directly concerns two lives. The operation cannot *rightly* be conducted without all the appurtenances of a surgical operation, for neither asepsis, proper retraction of the vagina, nor adequate repair can be done in the absence of skilled help. Wyder (25) maintains that deep incisions are for the clinic only; if this is so, then vaginal hysterotomy needs all the facilities of the hospital.

Armamentarium. The instruments needed are broad retractors, and one long retractor for pulling back the bladder, four or more vulsella, numerous artery-forceps, scissors, a knife, long heavy dressing-forceps, assorted needles, needle-holder; suture materials of catgut, silkworm-gut, and long, heavy strands of silk.

The bladder and rectum must be emptied.

1. *Overcome the Resistance of the Pelvic Floor.* (*a*) Schuchardt-Dührssen Incisions. Dührssen (68) recommended that the perineum and vagina should be incised down through the levator ani and constrictor cunni in order that resistances might be overcome in delivering a head, or to gain space in removing large tumors per vaginam. Schuchardt (69), some time later, advised a modification of Dührssen's procedure.

Dührssen's Perineo-vaginal Incision. A vaginal incision is made between four and seven centimeters long, in the right lateral sulcus. The upper end of this incision is not far from the spine of the ischium. Externally, this incision terminates below the Bartholinian gland. An external incision is then made downward to the right, terminating in the line of the anus and tuberosity of the ischium. The wound is so deep that the constrictor cunni and levator ani are cut. Care must be

taken that the skin incision is not made too near the ischium, for Dührssen states that if this is done, the retraction of the vaginal mucuos membrane will interfere with good coaptation. The vaginal wound is repaired with catgut; the external wound with silkworm-gut.

Schuchardt Incision. Schuchardt advises that an incision be made laterally in the vagina from the carcinomatous cervix (this incision need not go so high up if carcinoma is not the indication for operation) to the vulva. A second incision is made from this external point to the sacrum, with a curve about the anus, two fingerbreadths from it. This incision is eighteen to twenty centimeters long. The recto-ischiatic fossa is opened, so that externally the wound is bounded by the pelvic wall, and internally by the levator ani and vaginal wall. The transversus perinei is cut. Schuchardt advises that the repair be made with silk, although a good lasting catgut reinforced by silkworm-gut would seem preferable. Further, he places a drainage-tube in the lower angle of the wound.

(*b*) *Manual Dilatation.* Webster (70) adopts the plan of manually dilating the vagina as a precursor of the vaginal Cæsarean section. This is a procedure recommended by Edgar (71) in primiparæ with rigid external parts.

Of the three methods, manual dilatation will answer all necessities in the vast majority of cases with the least injury to the mother, and should be the elective routine procedure in primiparous women, or others with resisting pelvic floor. The incisions of Dührssen and Schuchardt are so extensive and mutilating, and have such danger of not healing primarily, that they should not be used except as a last resort.

Preliminary Dilatation of the Os. Rühl (72) alone advises that there be a preliminary blunt dilatation of the os, so that the incisions may be kept as short as possible, and that after the repair there shall be sufficient drainage. These arguments are largely specious. However, if instrumental or manual dilatation be used as a preliminary precaution, operators would find small necessity for a cutting operation, as one may rarely tell the resistance of the cervix until he has tried artificial dilatation.

3. *Colpotomy.* The cervix is grasped with vulsella on either side. Later, the vulsella may be replaced with heavy silk ligatures, if desired. If a double colpotomy is to be done, the posterior cut, preferably, is made first. This transverse incision need not be more than four centimeters long, and should be at the cervico-vaginal junction. The anterior incision, likewise, should be transverse and of the same length. Webster (73) in one case prolonged the anterior incision to the lateral fornices in order to be able to ligate the uterine arteries quickly, if hemorrhage should occur. This was in a placenta prævia. In connection with the anterior opening it is useful to make a longitudinal vaginal incision, extended from the middle of the transverse cut towards the meatus, the so-called T incision. This is particularly valuable in the event of the vagina being congenitally small, or contracted from scars.

4. *Trachelotomy.* The typical procedure is that of Dührssen. The anterior and posterior colpotomy having been made, the peritoneum in the Douglas pouch is separated from the uterus. The bladder in like manner is separated from the uterus. Thereupon the posterior cervical wall is bisected to the extent of about six centimeters. The anterior wall is then bisected up nearly to the bladder attachment. Again, the bladder is pushed up farther, and again the cut is extended. Two or three such maneuvers are carried out until the bladder is entirely separated in the middle, and also, perhaps, a short portion of the peritoneum. When completed, the anterior incision measures 12 to 14 cm. While these steps are in progress, the bag of waters projects more and more into the wound. The peritoneum and bladder generally separate more readily than in the non-pregnant state. The plan of using the combined incision is essentially that of Dührssen, for he mentions (34), "*in the case of full-time children, the necessity of splitting the anterior and posterior walls of the uterus.*" Rühl (72) contends that it may not be necessary to separate the bladder if the section is done for a previous vaginal fixation. In such cases he advises that the new incision be as close to the old scar as possible. He advocates that the combined incision be used when the

posterior lip is accessible. Rosenfeld (74), Acconci (17), Bacon (75), and most other operators, are inclined to believe both incisions are necessary. Bumm (18) and Webster (73), with others, believe the posterior incision is rarely necessary. Krönig (77) believes that the posterior incision alone may be utilized to secure space, but in one instance (78) he was compelled to make a short anterior incision.

5. *Delivery of Child.* Nearly all operators advise that version be the operation of election — the precept laid down by Dührssen. This recommendation is a wise one, for in nearly all instances the head is above the brim, which renders the forceps operation contraindicated. Dührssen contends that craniotomy is rarely indicated, although Staude (79) and Braun (80) did craniotomies, as the head could not be pulled through.

6. *Delivery of Placenta.* The use of vaginal Cæsarean section presupposes a grave complication. As it is done to save life, curtail time, and shorten an anæsthesia, it does not seem rational to await spontaneous expulsion of the placenta, as Bumm (18) practises, and which Dührssen (27) advises in the absence of hemorrhage. Neither does it appear rational for one to close partially the uterine cuts with the placenta *in situ*, as Bacon (75) advises. The writer (81) deprecates this practice, as, labor not having progressed, the uterus has not had time for retraction to occur. Therefore the os will not be *dilated*. The opening merely represents the result of incision, which, if repaired in part, might incarcerate the placenta. Secondly, the uterus, with the placenta *in situ*, may be too large to descend into the pelvis, which would render the placing of the highest sutures very difficult. Thirdly, the normal bleeding with the placenta *in situ* may blind the field. Theoretically and practically, it would seem better to remove the placenta by Credé or by manual means.

Dührssen (27) practises uterine tamponade as a prophylactic precaution. Bumm (77) finds the tampon is often necessary on account of atonic bleeding. If in the course of the repair he finds that the cervical canal will be narrow, he employs a glass drainage-tube. Rühl (82) contends that the tampon is superfluous, as the uterus needs no drainage. As the tampon is used either as a prophylactic measure or an actual therapeutic agent, his objection is not a valid one. The really great objection to the use of the tampon is that the sutures may be disturbed when the gauze is withdrawn.

RADICAL VAGINAL CÆSAREAN SECTION

This term was introduced by Dührssen to designate the vaginal Cæsarean section followed by vaginal hysterectomy. As the operation is usually done for carcinoma, the technique must be modified by the circumstances of the individual case. In essential details, the procedure is as follows: The anterior and posterior fornices are opened more widely than in a conservative section — if possible, a circular colpotomy being done — generally preceded by a cauterization of the carcinomatous mass. The uterus is pulled down in the usual manner, the lips bisected, and the child and placenta delivered. By strong traction the uterus is pulled deeply into the pelvis, the anterior and posterior uterine walls progressively cut until the uterus is completely bisected. Each side is successively cut off as the vessels and ligaments are ligated. As the vessels are put to such strong traction, there is very little bleeding. This method is similar to that of Müller. So states Dührssen.

DANGERS AND MORTALITY

The worst enemies of an operation are those who maintain that there are no evil consequences. Two factors are closely associated with the results of an operation — one, the indication which demands the procedure; the other, the inherent dangers of the operation itself. As these factors are so intimately dovetailed into each other, it is impossible to differentiate clearly between the respective sources of the mortality. To prove clearly and positively the innocuousness of a procedure, it would be necessary to try it in a large number of successive cases which have no lethal complication. Some satisfactory conclusion may be reached by comparing the results obtained by several operative measures for a particular indication. Dührssen (34) makes an absurd conclusion when he states that the mortality of vaginal Cæsarean section in 376 cases was

12.7 per cent, when the indications have run the gamut from uterine colic (Everke, 27), through psychoses, placenta prævia, ablatio placentæ, eclampsia, threatened rupture of the uterus, to moribund cases of heart disease. I am sure Dührssen (34–45) has too much enthusiasm when he states that the operation is without danger to mother and child. Surely, Mainzer (83) is led astray by enthusiasm when he claims that the operation is extraordinarily easy and without danger. Rühl (55) unquestionably is in consonance with sound judgment when he states that the operation should be reserved for those skilled in vaginal work, as it is much more difficult than abdominal Cæsarean section, especially when it must be done quickly. It is the consensus of opinion that while abdominal gynecic operations are more dangerous than vaginal cœliotomies from infection and shock, they are technically easier. This applies equally to the two types of Cæsarean section.

The dangers of vaginal Cæsarean section and cervical incisions are four: 1. Infection; 2. Injuries (mother and child); 3. Hemorrhage; 4. Effect on subsequent labors.

Findley (67) has ably pointed out valid objections to the operation from the standpoint of the gynecologist.

1. *Infection.* All will concede that the liability to infection is minimized when working through the vagina. This is not due so much to the control of asepsis, for it is not possible to cleanse the vagina as thoroughly as the skin, and it is not possible to have perfect control of asepsis with the close proximity of the rectum, but it is due to the fact that the pelvic structures are better able to care for the minimal infection introduced, and that the peritoneum is not manipulated. Bumm (18), of his 13 operations, had 3 cases in which the wound failed to unite, due to infection.

2. *Injuries.* The same statements used in defending cervical incisions are now applied in defense of vaginal Cæsarean section; i. e., that they are without danger. It is a weakness of human nature not to tell of failures. Here and there one will be courageous enough to show facts; it is high time that certain members of the profession recognize that no operation is without danger. Necessity permits a risk. That a true estimate of the dangers entailed may be appreciated, unavoidable accidents should be recorded.

First, as regards cervical incisions. Hofmeier (84) reports a case in which the rigidity due to the scar of an incision done in a previous labor resulted in a uterine rupture. Gessner (85) records a case in which an incision on the left side tore into the parametrium; in another instance the vagina was torn nearly its entire length. The writer has repeatedly tamponed the uterus on account of cervical hemorrhage after incisions. Fortunately, in no instance was there a deep extension of the cut.

Kerr (24) injured the bladder during a vaginal Cæsarean section. Frank (86) likewise injured the bladder during the operation. Winter and Hammerschlag (87) and Thorn (22) had extension of the anterior incisions by tearing. They could deliver only after craniotomy. Dührssen would say that this was due to insufficient incision; but how may this risk be entirely eradicated, when he states the opening need only be large enough to admit the fist of a large man? — an uncertain dimension. Those who practise buttonholing the uterus, then tearing the uterine wall in doing the typical Cæsarean section, know how easily the uterus tears when its textural continuity is broken. Webster (59) could not deliver the after-coming head, so he applied forceps, extracting a dead baby with great difficulty. These cases of Webster, Winter, Thorn, Braun (28) are sufficient evidence that there is a needless risk in attempting this operation in contracted pelves, and tend to refute the statement that in minor grades of pelvic contraction the dystocia is due to the soft parts, and not to the bones. Finally, we have Bumm's (18) statement that of his thirteen women operated upon, the wound failed to unite in three. This proportion of failures is about the same as that for primary trachelorrhaphies, and is in consonance with Dührssen's repeated *dictum*, that cervical incisions heal as well without as with sutures.

3. *Hemorrhage.*[1] Bumm (18) announces the fact that he never saw a mishap or complication in vaginal Cæsarean section. Yet, three years

[1] Since writing the paper, I have heard of one of our most able operators who met with such uncontrollable hemorrhage at the onset of an operation that he had to desist, so he delivered the woman by abdominal Cæsarean section.

later (77), he says that, "Frequently, atony follows, which must be combated by tamponade." If atony is not a complication to vaginal Cæsarean section, then it must be an integral part of the procedure. Whether one or the other, it means danger to the mother. Then we have Wanner (88), who had severe hemorrhage four hours post-partum, which was only controlled by tamponade. The numbers of cases which have had severe, disconcerting hemorrhages never will be written, for few will have the inclination to show how dangerous the operation may be.

4. *Effect on Subsequent Labors.* In discussing this aspect of the question, it is necessary to omit from consideration all cases in which the operation was primarily done for true cervical rigidity. Such cases, in all probability, will be attended with dystocia in later labors. The cervix, not the operation, should be held at fault. A true estimate, therefore, of the dangers from subsequent dystocia may properly be considered only in those cases in which the contributory indications alone dictated the operation. For example, Dührssen (34) states that there were nine vaginal Cæsarean sections with later labors, in only one of which was there a disturbance in the subsequent labor. This case (Rühl's) was operated on the first time for cervical rigidity. Operative interference was again required, on account of the persistence of the same pathological condition. As too short a time has elapsed for one to speak authoritatively on this question from experience, one must be limited to *a priori* reasoning. Labhardt (89) has covered the effect of injuries with their resulting scars in subsequent labors. He maintains that if a cicatrix tends to tear in the uterine body, which retracts in labor, then scars are more certain to tear when in the lower segment, which stretches in labor. He points out that Olshausen and Hofmeier have shown that degenerative changes in the uterine muscles predispose to uterine rupture, and that scars accompanying this change play first role. Peham reported three cases of uterine rupture whose ætiological factor was rupture in the previous labors. Likewise, Küstner records a similar case. Webster (92) says: "I am not so certain that there may not be trouble in after-labors from stretching or tearing of the scar which is made in the lower uterine segment. Neither am I sure that the scar will be less liable to stretch than a uterine scar which is produced by an abdominal section." It is self-evident that the uterine wound in abdominal Cæsarean section may be more perfectly coaptated than that in the vaginal operation, which, at best, is placed unfavorably for accurate suturing. It is possible to unite the wound so accurately in a typical operation that a macroscopic scar is not demonstrable. Everke (90) has given evidence of this in two cases. I reported a year ago (91) a case of Cæsarean section for double tubercular coxitis with resulting ankylosis, in which I did a second section in July. On neither the peritoneal or mucous surfaces was there the slightest vestige of a scar. Imperfect union in Cæsarean section is due to imperfect technique; possibly to retention of blood between the wound surfaces and to infection. As already shown, Bumm had failure of union in three of his thirteen women. For this to occur in typical operations would strongly suggest a very faulty technique. As we cannot control conditions so well in vaginal work, the result is not surprising. It is just in such cases as those of Bumm — faulty union with infection — where we may with a high degree of probability expect more or less serious dystocia in subsequent labors.

CONCLUSIONS

1. The adaptation of colpotomy and trachelotomy to obstetric surgery as vaginal Cæsarean section is one of the greatest advances of recent times.

2. Acconci and Dührssen are the indubitable originators of the modern operation.

3. Vaginal Cæsarean section is almost indispensable in certain cases of true cervical rigidity. In the absence of complications, expectancy, aided by hystereurysis, should be precursors of the major operation.

4. In the presence of grave contributory complications, as eclampsia, heart disease, etc., complicated by cervical rigidity, the operation is indicated.

5. We do not know when so-called *operable* carcinomas of the cervix have metastatic involvement of adjacent glands. If the carci-

noma, limited to the infravaginal cervix, has glandular metastases, then the radical vaginal Cæsarean section is only a temporizing measure; at a later very early moment, removal of the glands is indicated, after the technique of Ries and Wertheim. Evident encroachment of the cancer into contiguous tissues should be held a contraindication to the radical vaginal procedure.

6. Rarely will vaginal Cæsarean section be the operation of election in fibroids blocking the pelvis in labor. The abdominal route probably will continue to be the method of choice.

7. Eclampsia, *per se*, is not an indication for vaginal Cæsarean section. If the cervix is uneffaced, or if it is rigid, then the operation becomes a clinical necessity. Thus far the results, in general, have not been any better by this new procedure than by means of the manual method or Bossi dilators.

8. Vaginal Cæsarean section is an irrational procedure in placenta prævia, and nearly so in ablatio placentæ. A placenta prævia with the placental site on the posterior wall, with a rigid os, in the absence of hemorrhage, might be an indication for vaginal Cæsarean section.

9. The most approved technique includes anterior and posterior incisions, version, immediate removal of the placenta, repair, with tamponade if necessary. Vaginal Cæsarean section demands hospital facilities, if it is to be done rightly.

10. The dangers of the operation are real, and comprise injuries to the bladder, tearing of the uterus, and hemorrhage both from the incision and from uterine atony. Probably time will prove that dystocia in subsequent labors is directly due to cicatricial contractions of the scar, or that rupture of the uterus is a sequential accident.

BIBLIOGRAPHY

1. LAUVERJAT. SURGERY, GYNECOLOGY AND OBSTETRICS, July, 1906, p. 74.
2. COUTOULY. Braun. Lehrbuch der Gesammte Gynäk., 1881, p. 725.
3. BAUDELOCQUE. Obstetrics, Heath's translation (Dewees), 1811, p. 528.
4. DEWEES. Midwifery, 1835, p. 377.
5. SIMPSON. Vaginal Hysterotomy in Labors Obstructed by Uterine and Vaginal Carcinoma. Obstetric Memoirs and Contributions, 1855, vol. i.
6. BEDFORD. Principles and Practice of Obstetrics, 1876, p. 644.
7. DEPAUL. Monatsschrift für Geburtskunde, 1876, bd. xiv.
8. HILDEBRANDT. Monatsschrift für Geburtskunde, bd. xix.
9. SKUTSCH. Archiv für Gynäk., bd. xxxi, h. 3, p. 460.
10. DÜHRSSEN. Wiener med. Presse, vol. xxxi, p. 33.
11. DÜHRSSEN. Archiv für Gynäk., vol. xxxvii, 1890, p. 27.
12. HOLMES. Amer. Jour. of Obstet., 1901, vol. xliv.
13. DÜHRSSEN. SURGERY, GYNECOLOGY AND OBSTETRICS, 1906, vol. ii, p. 261.
14. DÜHRSSEN. Allgemeine deutsche Arztezeitung, Nos. 7, 8, April, 1895.
15. ACCONCI. Rendiconto clinico dell anno 1894–95. Torino, 1896. Paravia e Comp. u. Rivista di Ostetricia, etc., Ottobre, 1896. (From Winckel's Handbuch, vol. iii, pt. 1.)
16. DÜHRSSEN. Vaginal Kaiserschnitt, July, 1896.
17. ACCONCI. Monatsschrift für Geburtshülfe u. Gynäk., 1899, p. 9.
18. BUMM. Centralblatt für Gynäkologie, No. 52, 1902.
19. RÜHL. Centralblatt fur Gynäkologie, No. 10, 1903.
20. DÜHRSSEN. Berliner klin. Wochens., 1889, No. 44, p. 964.
21. WEBSTER. SURGERY, GYNECOLOGY AND OBSTETRICS, April, 1906, p. 454.
22. THORN. Münch. med. Wochens., vol. xlvi, p. 1609.
23. DÜHRSSEN. Vaginal Kaiserschnitt, July, 1896, p. 4.
24. KERR. Jour. Obstet. and Gynec. of the Brit. Emp., 1904, No. 3.
25. WYDER. Winckel's Handbuch, bd. iii, t. 1, p. 176.
26. HOLMES. Amer. Jour. of Obstet., 1903, vol. xlviii, p. 19.
27. DÜHRSSEN. Winckel's Handbuch, bd. iii, t. 1, pp. 575 et seq.
28. BRAUN. Wiener med. Wochens., No. 28, 1898.
29. SPINELLI-DONADONI. Archiv ital. di gin., No. 1, 1899.
30. SIMON. Münch. med. Wochens., No. 21, 1903.
31. RÜHL. Zeitsch. für Geb. u. Gyn., Aug. 22, 1903.
32. EHRENDORFER. Centralblatt für Gynäkologie, No. 16, 1903.
33. BACCUS. Amer. Jour. Obstet., July, 1903.
34. DÜHRSSEN. SURGERY, GYNECOLOGY AND OBSTETRICS, July, 1906, p. 74.
35. RÜHL. Centralblatt für Gynäkologie, No. 6, 1896.
36. RÜHL. Winckel's Handbuch, vol. ii, pt. 1, p. 380.
37. REGNOLI. Atti d. Soc. it. di ost. e gin., 1900.
38. BENNICKE. Centralblatt für Gynäkologie, No. 23, 1906.
39. WENNERSTROM. Cent. für Gynäk., No. 10, 1903.
40. PETERSEN. Monats. für Geb. u. Gyn., 1905, pp. 567, 738.
41. ORTHMAN. Monats. für Geb. u. Gyn., vol. viii, No. 5, p. 718.

42. WERTHEIM. Winckel's Handbuch, bd. 2, t. 1, p. 478.
43. JOEDICKE. Inaugural Thesis, Leipzig, 1903.
44. WINTER. Verhandl. der deut. Gesell. für Gynäk., Giessen, 1901, p. 82.
45. DÜHRSSEN. SURGERY, GYNECOLOGY AND OBSTETRICS, March, 1906, p. 259.
46. CRAGIN. SURGERY, GYNECOLOGY AND OBSTETRICS, July, 1905, pp. 94 et seq.
47. STROGANOFF. Vartch, Nov. 10, 1901 (Cent. für Gynäk., Nov. 23, 1901).
48. ESCH. Zeitschrift für Geb. u. Gyn., vol. lviii, h. 1, p. 11.
49. HOLMES. Jour. Amer. Med. Assoc., May 20, 1905.
50. DÜHRSSEN. Cent. für Gynäk., No. 13, 1904.
51. STEFFICK. Cent. für Gynäk., No. 20, 1904.
52. HENCKEL. Cent. für Gynäk., No. 8, 1906.
53. DÜHRSSEN. Cent. für Gynäk., No. 27, 1904.
54. GOODELL. Amer. Jour. of Obstet., 1890, p. 271.
55. RÜHL. Cent. für Gynäk., No. 47, 1901.
56. REGNOLI. Cent. für Gynäk., No. 46, 1902.
57. MILLER.
58. DÜHRSSEN. Volkmann's klin. Vorträge, 232.
59. WEBSTER. SURGERY, GYNECOLOGY AND OBSTETRICS, No. 4, 1906, p. 453.
60. RÜHL. Monats. für Geb. u. Gyn., Erganzungsheft, 1904, p. 468.
61. DÜHRSSEN. Archiv für Gynäk., bd. lxxv, h. 2.
62. ZIETSCHMANN. Monats. für Geb. u. Gyn., 1905, bd. xxii, No. 4, p. 604.
63. STAMM. New York State Jour. of Med., Feb., 1906.
64. DÜHRSSEN. Manual of Obstet. Prac. 1897, p., 242.
65. ZWEIFEL. Lehrbuch der Geb., 1895, p. 492.
66. SCHAUTA. Gesammte Gynäk., 1897, vol. i, p. 562.
67. FINDLEY. Med. Herald, April, 1906.
68. DÜHRSSEN. Archiv für Gynäk., bd. xxxvii, h. 1, p. 128.
69. SCHUCHARDT. Zeitschrift für Geb. u. Gyn., 1894, bd. xxviii, p. 405.
70. WEBSTER. SURGERY, GYNECOLOGY AND OBSTETRICS, April, 1906, p. 454.
71. EDGAR. Practice of Obstetrics, 1903, p. 434.
72. RÜHL. Cent. für Gynäk., No. 28, 1904.
73. WEBSTER. Amer. Jour. of Obstet., 1905, vol. li, p. 835.
74. ROSENFELD. Vratch, No. 29, 1903.
75. BACON. Amer. Jour. of Obstet., 1904, vol. x, p. 488.
76. WEBSTER. Amer. Jour. of Obstet., 1905, vol. li, p. 834.
77. KÖNIG, BUMM, ETC. Deutsche Gesellschaft für Gynäk., Kiel, June 13–17, 1905.
78. KÖNIG. Cent. für Gynäk., No. 39, 1904.
79. STAUDE. Cent. für Gynäk., No. 47, 1905.
80. BRAUN. Wiener med. Wochenschrift, No. 28, 1898.
81. HOLMES. Amer. Jour. of Obstet., 1904, vol. l, p. 522.
82. RÜHL. Cent. für Gynäk., 1904, No. 20, p. 651.
83. MAINZER. Deutsche med. Wochenschrift, No. 7, 1905.
84. HOFMEIER. Münchener med. Wochenschrift, No. 3, 1903.
85. GESSNER. Zeitschrift für Geb. u. Gyn., vol. xxxii, p. 290.
86. FRANK. Weiner med. Wochenschrift, No. 12, 1901.
87. WINTER UND HAMMERSCHLAG. Cent. für Gynäk., No. 36, 1904.
88. WANNER. Cent. für Gynäk., No. 45, 1904.
89. LABHARDT. Zeitschrift für Geb. u. Gyn., bd. liii, p. 478.
90. EVERKE. Monats. für Geb. u. Gyn., 1905, vol. xxii, p. 432.
91. HOLMES. Amer. Jour. of Obstet., 1905, vol lii, p. 915.
92. WEBSTER. Amer. Jour. of Obstet., 1904, vol. l, p. 523.

A REVIEW OF OVER FOURTEEN THOUSAND SURGICAL ANÆSTHESIAS

By ALICE MAGAW, Rochester, Minnesota
Anæsthetist to St. Mary's Hospital

SINCE the discovery of ether in 1846 by William Morton, much has been written about anæsthetics and their administration, and still ether and better etherization is more in favor to-day than ever before.

We are indebted to Dr. Bevan and Dr. Mellish for their most excellent articles on this important subject, on the after-effects as well as the administration of anæsthetics.

At St. Mary's Hospital our preference has always been ether. In 1905, out of 3,080 anæsthesias 2,847 were ether. In 14,380 anæsthetics given by me, I have yet to see a death directly from the anæsthetic, but, no doubt, have had my share of trouble in its administration, although artificial respiration with us is almost unheard of. Our experience with ether has become more gratifying each year. In my series of cases, the "open method" has been the method of choice. We have tried almost all methods advocated that seemed at all reasonable, such as nitrous oxide gas, as a preliminary to ether (this method was used in 1,000 cases), a mixture of scopolamine and morphine as a preliminary to ether in 73 cases, also chloroform and ether, and have found them to be very unsatisfactory, if not harmful, and have returned to ether "drop method" each time, which method we have used for over ten years.

On account of this method not being followed properly, it is not always appreciated. We use a four-ounce ether-can and fit an ordinary cork with a groove on either side into its mouth, fill one groove with absorbent cotton and let it extend out of the can about one inch. One can regulate the drop easily by the manner in which the point is clipped. We usually fix two cans, one with a large dropper, and use it until the patient is fully under the anæsthetic, and then change to the other can with the small dropper, and continue its use during the operation.

Patients usually walk into the operating-room and mount the table with assistance. All foreign bodies, such as artificial teeth, chewing-gum, etc., are removed. The hands are fastened loosely across the chest with a wide gauze bandage, to prevent the arms falling over the sharp edges of the table, an accident which so often causes musculospiral paralysis. A pad of moistened cotton is placed over the eyes to protect them from the anæsthetic. If, during the course of administration, some of the anæsthetic should fall into the eye, drop a few drops of castor-oil into the conjunctival sac, to prevent the conjunctivitis that would otherwise follow.

It is a mistake to think that the same elevation of the head will do for all patients. The anæsthetist should elevate the chin to such a position as not to bend the neck too far back or approximate the jaw too near the sternum. Proper elevation of the head will relax all tissues of the neck and give more freedom in breathing. This, also, can be said of the jaw. Holding the jaw up and forward, and keeping it in position so that the patient gets the greatest amount of air possible, is an important feature in giving an anæsthetic. While too much emphasis cannot be laid on this necessary requisite in giving an anæsthetic, all jaws cannot be handled in the same manner. When a patient has removed a double set of artificial teeth, the tongue will often cleave to the roof of the mouth during the administration, and raising the jaw sets the gums so firmly together that most of the air is shut out, and this may not be noticed until the patient is cyanotic. We have found, in this class of cases, that if the jaw is held but slightly up and forward and the thumb of the same hand inserted between the gums, thereby holding the tongue down, faulty respiration will be corrected at once and the color restored. This is one of the instances where the holding up of the jaw too firmly can be overdone.

The inhaler used is the improved Esmarch, with two thicknesses of stockinet (frame boiled and stockinet changed after each patient). We use the dropper described, dropping as

slowly and carefully in giving the ether as though it were chloroform, until the patient's face is flushed, and then a few layers of surgeon's gauze are added, and the ether given a trifle faster until the patient is surgically etherized; then return is made to the same covering as at the start, and the regular drop continued throughout the operation.

As it requires very little ether to keep a patient surgically etherized, one can change to the small dropper during the operation. A much deeper narcosis is required to start an operation or to make the incision than later on, when the operation is in progress. It is useless to touch the cornea, as so many advocate, as it tells us nothing and is unscientific. Only the inexperienced take the pulse and touch the conjunctiva when giving ether.

Suggestion is a great aid in producing a comfortable narcosis. The anæsthetist must be able to inspire confidence in the patient, and a great deal depends on the manner of approach. One must be quick to notice the temperament, and decide which mode of suggestion will be the most effective in the particular case: the abrupt, crude, and very firm, or the reasonable, sensible, and natural. The latter mode is far the best in the majority of cases. The subconscious or secondary self is particularly susceptible to suggestive influence; therefore, during the administration, the anæsthetist should make those suggestions that will be most pleasing to this particular subject. Patients should be prepared for each stage of the anæsthesia with an explanation of just how the anæsthetic is expected to affect him; "talk him to sleep," with the addition of as little ether as possible. We have one rule: patients are not allowed to talk, as by talking or counting patients are more apt to become noisy and boisterous. Never bid a patient to "breathe deep," for in so doing a feeling of suffocation is sure to follow, and the patient is also apt to struggle.

In gall-bladder work, nearness to the diaphragm causes an irregular respiration, and this is sometimes mistaken for a call for more anæsthetic, when more often it is just the reverse. If the patient is surgically anæsthetized, the irregular breathing and grunting does not interfere with the surgeon. Instead of drowning the patient with the anæsthetic, remove the mask at this stage and allow him plenty of air, and he will not become cyanotic. This is also true of operations on the sphincter muscles. Any manipulation will be followed by the same symptoms. Respiration is often interfered with in this class of cases. Obstruction is caused by the tongue falling back and depressing the epiglottis. Should any of these symptoms arise during the administration, raise the jaw up and forward, and instead of using tongue-forceps, catch the tongue with a piece of gauze and draw it up and toward the nose, a little to one side, withdrawing the anæsthetic. Should mucus become troublesome, one can easily wipe it out with an extra piece of gauze prepared for that purpose.

The dose required for each individual patient cannot be estimated so as to be of any value, as it depends largely on the temperament of the patient, pathological condit on present, time consumed in anæsthetizing, and operating. The only one that can judge is the educated anæsthetist, who will give only what is needed to do good work. From experience we know a patient can be brought under ether in from three to five minutes, and, when ready, patients do better if the operation is started at once. Often the anæsthetist is blamed for not having some positive sign of complete narcosis. We have never found a single positive sign upon which we could rely. If the surgeon and anæsthetist are accustomed to each other, the surgeon seldom asks if the patient is ready. He knows from the deep respiration, color, and relaxation. Failures are in the acute peritonitis cases and in alcoholics. There are many signs that guide, such as deep respiration, relaxed jaw, as well as relaxed muscles; yet these signs sometimes fail. If the patient is kept in an even surgical anæsthesia, there is not enough change in the patient to warrant all the useless fussiness we sometimes see on the part of the anæsthetist. I rely a great deal on the relaxation of the jaw, both before and during operation. When the Trendelenburg position is necessary, it means trouble for the surgeon, and simply delays all work, to start the operation before complete relaxation.

During the operation, as soon as the patient begins to get control of the jaw, more com-

plete narcosis is required. If the jaw is relaxed and in place, respiration deep and regular, color normal, quality of pulse good, there need be no fear about the rate of pulse or the pupils. Other points being equal, they are certain to be right.

As a rule, any person fit for a serious operation is also fit for an anæsthetic, but no one is so free from danger that care in watching its effects can be dispensed with. The cases requiring the greatest care are not the young and anæmic, for whom a small dose is sufficient, but the strong and vigorous, who inhale deeply and are inclined to struggle.

There is no class of cases that requires more close watching of every detail than the stomach cases, because they are poor subjects for anæsthesia of any kind, and the anæsthetist should be familiar with each step of the operation, so as not to give one drop more of the anæsthetic than is absolutely necessary. We give one sixth of a grain of morphine thirty minutes before the administration of ether, and the patient is given just enough to produce surgical anæsthesia, and as soon as the stomach is explored and the method of operation decided upon, the ether is withdrawn, the surgeon being able to continue operation, no more being given until time to close the incision.

In this class of cases the patients are allowed to become almost conscious many times, as the stomach is not sensitive, and there is no pain in the visceral work; thus we are able to complete the operation and avoid vomiting with an exceedingly small amount of anæsthetic.

The rolling of the eyeballs as noted by Simpson, swallowing, and control of the jaw are signs of returning consciousness, and a call for more ether. While we give less anæsthetic in this class of cases than in any other, it is this class that is most prone to pneumonia.

During the thirteen years' work at St. Mary's Hospital all patients have been anæsthetized on the operating-table in the operating-room, and preparation of the patient was going on at the same time. Experience has taught us that preparation of the patient while going under the anæsthetic is one of the important factors in producing a rapid surgical narcosis; for it diverts his attention, and much less anæsthetic is required. It matters not in what position the patient must be for operation, we fix him accordingly, and the preparation is begun at the same time as the anæsthetic, and we feel certain that this procedure enables us to hasten narcosis.

In the Trendelenburg position, where the preparation is in progress during the administration of the anæsthetic, the deep respiration, etc., empties the pelvis, so that by the time the operation is started the small bowel will be found in the lower abdomen and out of the way, and maybe packed off. We have found this practice more helpful to the surgeon than placing the patient in position after the completion of narcosis.

In giving an anæsthetic for this class of surgery, the skill and patience of the anæsthetist is tried to the extreme; the patient must be fully anæsthetized, but not too profoundly. Patients having an acute peritonitis, as is so often found in this class of cases, require a much larger amount of anæsthetic to produce relaxation of the abdominal muscles. When the patient is prepared during the administration of each anæsthetic, there is no time lost, the surgeon and his assistant being ready by the time the patient is surgically anæsthetized. Another important reason for anæsthetizing the patient on the operating-table is, that in lifting and shifting a patient about, he is apt to regain consciousness, with vomiting, etc., and the administrator is not positive of the condition of his patient. Should ether produce difficult breathing, profuse secretion of mucus, or cough, lift the mask from the face, allow a liberal amount of air, and then continue with the ether. In giving plenty of air when needed, and less anæsthetic, we have found little use for an oxygen-tank, a loaded hypodermic syringe, or tongue-forceps. It is far better for the anæsthetist to become skillful in watching for symptoms and preventing them, than to become so proficient in the use of the three articles mentioned. We are exceedingly careful in our selection of cases with colds. An acute cold is a contraindication to any anæsthetic, but as soon as the cold becomes chronic there is not much danger from etherization, and instead of operating during an acute cold and giving chloröform (unless in an emergency), we wait a few days until the acute

attack has passed, and then they are as good subjects for ether as for any other anæsthetic. Chronic bronchitis is often improved by an anæsthetic.

Pulmonary tubercular cases stand ether well. It has been proven that pneumonias follow a local anæsthesia as well as a general, so the trouble is not wholly from the anæsthetic. We often have a lung œdema present during the administration of an anæsthetic, and for several hours after an operation, that is often mistaken for ether pneumonia, but the œdema will clear up about the time an ether pneumonia should begin.

There is also an embolic and septic pneumonia that occurs independently of the anæsthetic and is due to an infection, and will sometimes occur with or without a general anæsthetic.

The dangers of general anæsthesia depend more on the lack of experience and incompetency of the anæsthetist than on the drug itself, in most instances. Many operations do not demand the long anæsthesia of ether, with its discomforts, neither do they warrant the dangers of chloroform anæsthesia. In this class of operations we have been using primary anesthesia, and find it preferable to nitrous oxide gas, chloroform, or ethyl bromide.

Formerly, operations for exophthalmic goiter were looked upon with a greal deal of dread, on account of the anæsthetic. We have found these cases, when properly managed, and the ether given by the "drop method," were as good subjects for anæsthesia as any other class of cases of the same gravity. We also give these cases $\frac{1}{6}$ of a grain of morphine and $\frac{1}{120}$ of a grain of atropine, the latter to avoid tracheal mucus, thirty minutes before operation, and find it very helpful in tiding the patient along with but a small amount of anæsthetic.

The method of giving chloroform is quite like that of ether; yet there are marked differences to observe. Chloroform should be given with more air and in less quantity, with the regular and small drop. Chloroform acts quickly, and should be given slowly and carefully, the pulse being taken at the facial or temporal arteries. Anæsthetists should never allow either the patient or themselves to feel hurried. Stop inhalation as soon as patient has reached surgical anæsthesia, giving just what is needed, and not one drop more. When struggling occurs, withdraw the chloroform entirely until the patient is quiet, as struggling will produce deep inhalation; hence the danger. Embarrassment in respiration during the administration of chloroform should always be considered serious, and it requires prompt attention and an immediate withdrawal of the drug.

The pulse often misleads the novice. It may be very weak just before vomiting, when one might think there was less need of anæsthetic, while really it is a call for more. A thready, intermittent pulse indicates trouble. As Dr. Finney says: "It is well to watch the character and rate of pulse, but of far more importance to watch the respiration as the earliest indication of danger." The eyes may give warning of danger. A rapidly dilating and fixed pupil is a danger signal, while a pupil contracted to a normal size or a little less indicates surgical anæsthesia. The color of the blood is also important. Watch all symptoms, but do not rely on any one of them. When giving chloroform to children, I never feel safe if the child is profoundly under, and I try to avoid this condition, aiming to keep it as nearly as possible in moderate anæsthesia. An unsatisfactory pulse or respiration is a call for plenty of air. By doing this there will be little need of the numerous drugs so often resorted to.

Nearly all fatalities on the operating-table due to an anæsthetic are from chloroform, either mixed with some anæsthetic or given unadulterated. Public opinion is so much in favor of ether at the present day, that if accidents in its use occur, the surgeon will not be blamed, and it is to his interest, as well as to that of his patient, to see to it that his anæsthetist becomes proficient in the administration of all anæsthetics, especially ether.

While surgeons know that a competent anæsthetist is one of the important factors in the operating-room for his own comfort, as well as for that of his patient, there is no class of work that has so little encouragement, and few are willing to follow this line of work (that, in difficulty and nerve-strain, is next to that of a surgeon) long enough to become familiar with the first requirements of a good anæsthetizer.

To give an anæsthetic properly is all one person can do, and he who undertakes to learn surgery at the same time makes a serious mistake. It has been my privilege to instruct several in the administration of anæsthetics, and I must say that nurses become the most proficient in this line of work. They do not aspire to be either a surgeon or an assistant surgeon; hence it is not difficult for them to give their undivided attention to the anæsthetic. I am sure the time is not far distant when nurses will be looked upon as best fitted for the administration of anæsthetics.

One derives little or no benefit from textbooks. While one should be competent in the theoretical part of this important work, there is nothing so helpful to the anæsthetist as the hard school of practical experience.

FIRST SURGICAL CLINIC, VIENNA, AUSTRIA

Prof. Dr. A. von Eiselsberg

THE PLASTIC SURGERY OF THE EYELIDS BY THE USE OF PEDUNCULATED DOUBLED SKIN FLAPS

By H. LEISCHNER, M. D., Vienna, Austria
Assistant at the First Surgical Clinic

DEFECTS of the lids, which require surgical treatment, consist either of a loss of superficial skin, with an intact conjunctiva palpebræ, or of a loss of a part of the lid in its complete thickness. We possess several satisfactory methods of plastic surgery for defects of the former class, such as lateral displacement of flaps (Dieffenbach). The use of pedunculated flaps from the neighborhood of the eye (Fricke). Loose pieces of skin from distant parts of the body have also been used more or less successfully. Thiersch grafts, too, have been employed, although desirable results are not always obtained, because of the absence of a firm foundation.

It is a more difficult problem to replace a part of the lid which has been lost in its entire thickness. The use of the aforementioned methods is either entirely impossible, or several faults appear, rendering the plastic work entirely useless. Thus when simple pedunculated flaps are employed, the skin invariably retracts and the newly formed lid-margin produces a constant irritation of the eyeball by the delicate skin hairs; even concretion of the lid and the bulbus cannot always be prevented.

For these reasons new measures have been sought to provide good substitutes for lids lost *in toto*, and free from the faults mentioned; for individuals with such a deformity suffer not only bodily pain, but they also suffer in their social relations, on account of their very conspicuous malformation. The large number of blepharoplastic operations recorded in the literature proves the imperfection of any one method. I desire to mention only Denonvillier, Gradenigo, Wiecherkiewicz, and Landolt, who use part of the uninjured lid to replace losses of tissue. De Vicentüs, Eversbusch, and Wölfler covered the raw surface of a pedunculated skin flap with pieces of mucous membrane, and used the flap so prepared for their plastic work. Samelsohn called attention to the value of lining a pedunculated skin flap with a second pedunculated skin flap from the intact portion of the lid. Uhthoff then employed this method of making double flaps, which had already been used successfully in plastic work on the cheeks, to the surgery of the eyelids. Later, Jordan published three cases in which he used pedunctuated flaps from the frontal and temporal regions to replace defects in the lids, and formed an inner lining for the portion destined for the lid by doubling the free edge of the lid over on itself.

All of these operative measures present several deficiencies. Some of these are the post-operative sequelæ above mentioned; in addition, there are functional disturbances, retraction, and stiffness of the previously intact portion of the lid used to replace the lost tissue.

Jordan himself reports that in one of his cases — the other two he was unable to follow — there resulted suppurative conjunctivitis with corneal ulcers and hypopyon, which he attributes to the constant irritation of the lanugo hairs on the skin used to line the lid.

According to the more recent reports of Birch-Hirschfeld and Elter and Haas, the blepharoplasty indicated by Büdinger several years ago appears to offer the best results when the eyeball is preserved. It consists of the use of a pedunculated skin flap from the temporal or buccal region. This is lined by a small piece taken from the perina of the homolateral ear, the piece from the ear corresponding to the size of the absent tarsus, plus conjunctiva.

For a patient who had lost both eyelids *in toto* and the eyeball by a gunshot injury, Hofrath von Eiselsberg used doubled pedunculated skin flaps, according to Jordan, for the replacement of upper and lower eyelids. Because in this instance the method proved very satisfactory, and as it was possible to replace the lost eyeball by an artificial eye, the case seems to me worth publishing.

O. R., student, 24 years old, during his military service shot himself in the mouth in such a way that the bullet passed through the hard palate and left the skull at the supraorbital margin. The patient was taken to a military hospital and discharged as cured in six months. Healing of the wound was complicated by erysipelas. On account of the terrible disfigurement of the left side of his face, he applied for admission at the First Surgical Clinic at Vienna on October 21, 1903, for the purpose of having his disagreeable condition corrected. The changes presenting themselves in the face of this otherwise healthy individual were as follows: In the middle of the left supraorbital margin was a groove in the bone, ½ cm. in depth, covered by a scar, which was firmly connected with the underlying tissue. All that remained of both eyelids was a piece of skin 1 cm. long at the lateral margin of the orbit, provided with several cilia; this was firmly connected with the underlying bone. In the inner canthus was a piece of mucosa (apparently the remnant of the conjunctiva) 2 cm. broad; at its lower edge a small fistula discharged a colorless secretion (opening of the lachrymal duct). The middle of the orbit was crossed vertically by a band of cicatrized skin. The eyeball was entirely gone. At the infraorbital margin, the scar continued, deepened like a funnel at the attachment of the left ala of the nose, and extended across the upper lip, of which a wedge-shaped piece was missing, terminating in a hole in the hard palate, as large as a quarter-dollar.

Anterior rhinoscopy revealed a slit on the left side between the septum and the processus nasalis, only a few millimeters in breadth, through which it was not possible to make a satisfactory examination. The left upper incisor, bicuspid, and molar teeth (except the last molar) were missing. A hard rubber plate closed the defect in the palate.

It is further noteworthy, that the deformity was especially conspicuous in profile view, since the nose appeared very prominent, on account of the depression of the orbit and the absence of both eyelids. Fig. 1 shows the patient at the time of admission to the clinic.

The replacement of this extensive loss of tissue was carried out by von Eiselsberg in three tempos. The first operation, on the 27th of October, 1903, was intended to remove the scar from the cheek. The scar tissue was completely excised; the wound margins were mobilized and united by silk sutures. At the same time the edges of the wedge-shaped defect of the upper lip were freshened and sewed. The insignificant remains of the eyeball and lids left in the orbit were removed and the cavity packed with vioform-gauze. Healing of the wound was uneventful. In a week, numerous proliferating granulations were noted in the orbit, and on the tenth day after the operation an artificial eye of aluminum was introduced, which was cleaned daily and kept in place till the plastic operation on the upper eyelid (November 19, 1903).

The technique of this second operation was as follows: Freshening of the edge of the skin covering the supraorbital margin, preparation of a model of an upper eyelid, on a larger scale than natural, in view of future shrinkage. A flap of skin twice as large as this model was taken from the left temporal region, its pedicle lying below and very close to the lateral orbital margin. This flap was then doubled upon itself in such a way that its raw edges came together, in which position they were maintained by a few stitches. The skin flap, thus reduced in size by one half and folded over upon itself, was revolved ninety degrees to the right and sewed by its upper raw edge with silk sutures to the frontal skin along the supraorbital margin. A strip of vioform-gauze was

then introduced into the orbit and the raw surface in the temporal region covered with Thiersch grafts from the right thigh. This time, also, the course of healing was normal. On the 10th of December, 1903, the plastic work on the lower lid was undertaken. At this time, similarly, a pedunculated, doubled flap was taken from the left cheek, its pedicle also lying at the lateral margin of the orbit, but above the flap. After turning the flap upward ninety degrees, its free margin was sewed to the previously freshened skin at the lower margin of the orbit. The line of folding of the skin formed the margin of the eyelid. (See diagram.)

On the tenth day after the operation, the aluminum eye was again introduced into the orbit; the cavity was washed daily with hydrogen peroxide. In three weeks almost the entire cavity behind the new eyelids was covered with epithelium. On the 12th of

Fig. 1. O. R., 24 years old. Photograph taken before operation.

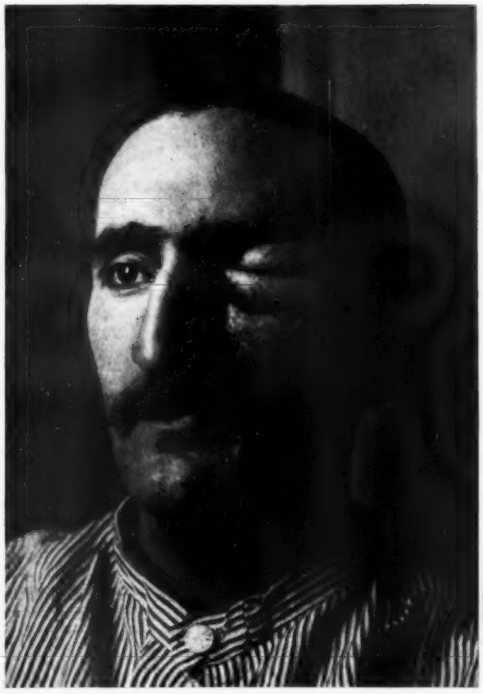


Fig. 2. Photograph taken after operation.

January, 1904, the patient was discharged from the hospital with the instruction to use the artificial eye at least several hours every day and to present himself again in a few months to get a suitable glass eye.

Fig. 2 shows the patient when discharged from the clinic.

For certain reasons the patient found it impossible to return for two years. In the mean time, the protuberance of the lids had disappeared, on account of contracture. In the central portion of the lower lid were numerous hairs, since this skin had been taken from the cheek. The orbital cavity was rounded, so that a sphere 1 cm. in diameter could be comfortably contained. It was attempted to remove the hairs from the lower lid, and this was very easily accomplished by the use of Röntgen rays. After three or four exposures of five to seven minutes, at intervals of a week, the hairs dropped out of themselves. An artificial eye was made by Optician Müller of

Fig. 3. Some œdema still present.

Wiesbaden to fit this orbit. It produced no discomfort to the patient. A pair of spectacles masks the scars produced by the operations.

Figs. 3 and 4 show the patient after his last stay in the hospital.

In this case, to resume, there was an extensive loss of tissue about the left side of the face as the result of a gunshot wound. Both left eyelids and eyeball were absent, a scar extended from the lower edge of the orbit to the upper lip, ending there in a triangular defect. The dime-sized opening in the hard palate had been closed by a hard rubber plate, which was so effective in preventing any subsequent disturbance of speech, that the patient could not decide in favor of operative intervention. The young man had sought the clinic only on account of the decided disfigurement of his face. The difficult problem of a cosmetic improvement was solved by first removing the abundant scar tissue on the cheek and closing the defect of the upper lip by freshening and sewing the edges of the wound, in two later operations building a new upper and lower lid by means of pedunculated and folded skin flaps from the neighborhood of the eye.

This method of plastic surgery (Jordan) proved especially adapted to this case. The principal fault of doubled flaps — the constant irritation of the eyeball by lanugo hairs — did not enter into this case at all, while advantages appeared which other measures do not possess. Ordinarily, when the eyeball is intact, it is desirable to use as thin flaps as possible, while in this case, on account of the injury to the bony framework of the orbit, it was necessary to obtain heavier flaps, which, while not stiff, might serve to hold an artificial eye in place. The new-formed eyelids at first seemed very plump; their margins were in contact, since they had intentionally been made much larger than a normal eyelid to provide for their tendency

Fig. 4. After operation.

to diminish in size. This fault corrected itself entirely. During the patient's second visit to the hospital, a slit had already appeared, and the bulging decreased. It was believed of especial importance that the patient should wear an artificial eye as soon as possible, so as to preserve a space in the orbit for a glass eye; otherwise the orbit probably would have been filled completely with granulation tissue. Not only was this entirely prevented, but, by proliferation of the epithelium from the side, the entire posterior wall of the orbit was lined with epithelial tissue, and the pocket behind the lids remained free from a secreting surface. The reason for performing the plastic operations in two sessions was that it was feared that if both lids were operated upon simultaneously, secretion might be retained in the space behind the lids and interfere with the healing of the wound. A further objection might be raised to the technique: that by the use of skin from the proximity of the eye, new disfiguring losses of tissue might be produced. This objection appears trifling, when we consider the results obtained from the use of the Thiersch grafts. Two years after the operation, these parts could be distinguished from the normal skin of the face only by being of a darker shade. Finally, it may be well to repeat that in this case the Röntgen rays rendered excellent service in removing the hairs of the beard from the lower eyelid (the flap had been taken from the cheek). It proved an easy matter to eliminate this cosmetically objectionable feature of the case.

We believe that in this case of extensive destruction of eyelids and eyeball, no other method would have produced such excellent results as the use of pedunculated, doubled skin flaps,

Fig. 5. Showing method of transplanting flaps.

and we recommend this method of blepharoplasty in all cases in which *the eyeball itself is absent*. Naturally, it was impossible to reproduce absolutely normal conditions, and a certain grade of deformity persisted, dependent especially on the asymmetry of the face. Since the loss of the lids resulted from a gunshot injury, and not, as in the vast majority of cases, from the extirpation of a malignant neoplasm, the case gives us the greater satisfaction, because we do not fear a recurrence, which might destroy the value of the operation.

DEPARTMENT OF TECHNIQUE

AMPUTATION OF THE CERVIX WITH THE AID OF AN INTRA-UTERINE TENACULUM

By R. C. COFFEY, M.D., Portland, Oregon

To perform a neat amputation of the cervix, using an ordinary double tenaculum or loops of thread as a tractor, is sometimes found to be one of the most tedious and annoying of the minor gynecological operations. This difficulty is brought about chiefly by the fact that the tractor necessarily includes the tissues to be amputated,

Fig. 1. 1. Cat-claw tenaculum, with fangs protruded through eyes of external tube. 2. Central rod, with fangs folded ready for insertion into tube. 3. Cross-section of central rod and tube, showing fangs being driven out through the eyes of tube, and held by ratchet and springs as rod is pushed in.

and must therefore be cut off as the operation progresses, or at other times is in the way.

About five years ago, the writer devised and described an instrument which was named the "cat-claw tenaculum," shown in Fig. 1. Since that time, this instrument has been used by us in all cases of operation for lacerated cervix, removing a V from the posterior uterine wall for congenital anteflexion, vaginal hysterectomy, or whatever other reason, and for amputation of the cervix. It has been found a very valuable aid in amputation of the cervix. Below is briefly described the method which we have used.

1. Pull down the uterus with an ordinary tenaculum-forceps. Insert the "cat-claw tenaculum" with fangs ensheathed in the tube of the instrument. The fangs are then protruded into the uterine tissues by pushing down the central rod, and held by the ratchet.

2. With scissors or knife, make two lateral incisions, extending as far up as it is desired to make the amputation. (Fig. 2.)

3. With knife and thumb-forceps, remove a wedge-shaped piece from each lip of the cervix, following the dotted lines shown in Fig. 2, and bring the edges of each side together with two heavy formalin catgut sutures, as shown in Fig 3.

4. With thumb-forceps and knife, remove the tissue in the angles, and place sutures as shown in Fig. 4. Fig. 5 shows the completed operation with the sutures tied. By pressure on the spring of the tenaculum, the ratchet is released, when the fangs may be withdrawn into the tube of the instrument and the instrument withdrawn from the uterus.

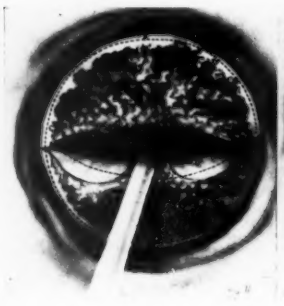


Fig. 2.

Fig. 3.

Fig. 4.

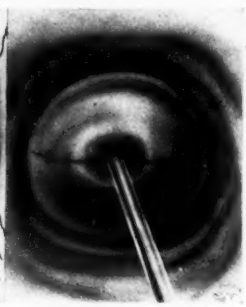


Fig. 5.

Fig. 2. Two lateral incisions have been made. Dotted lines indicate lines of incision for wedge from anterior lip and for posterior lip.
Fig. 3. V incision closed by two catgut sutures in anterior lip. Sutures placed for closing incision in posterior lip.
Fig. 4. Wedge being removed from the angles, and sutures for closing in position.
Fig. 5. Completed operation.

THE TECHNIQUE OF THE CHICAGO LYING-IN HOSPITAL AND DISPENSARY

By JOSEPH B. DE LEE, M.D., Chicago

As the name indicates, the institution has two departments — an indoor maternity service and an outdoor service, the latter carried on in the homes of the patients.

The technique of the indoor obstetric service differs very little from that practised in the various well-known maternities, wherefore it will not be described in this article.

The out-department, or dispensary service, is of much greater interest to the practitioner, because over fifteen hundred obstetric cases are treated yearly in the homes of the poor and poorest in Chicago, with a mortality and a morbidity that challenge the work of the best maternities in the world.

This home service is conducted from the Dispensary, situated in the heart of the poorest district of Chicago. The building was designed and constructed especially for the out-maternity service, and has the following rooms: Living-rooms, with kitchen and dining-room for four internes, eight students, and four nurses, also for the necesssary domestic servants; three examining-rooms and one large waiting-room for patients, which are used for the treatment of pregnant women, the diagnosis of pregnancy, and the mensuration of the pelvis; an office with telephone for the reception of calls to labor cases, and for dispatching the attendants to the cases; sterilizing-rooms for the preparation of the dressings, the filling of satchels, etc.; a library and writing-room, in which the students and internes write the histories of the cases; and a museum and laboratory.

The internes are licensed graduate physicians, and have a six months' service. The students are accepted only in their senior year, and have a two weeks' service. Both internes and students live at the Dispensary and devote all their time to the work.

The administration of the work is in the hands of a graduate nurse, who also lives in the building. She determines the succession of calls for internes and students, arranges for the post-partum visits by students, nurses, and internes, and she is acquainted with the condition of every mother and baby under the care of the Dispensary.

CARE OF WOMEN DURING PREGNANCY

Pregnant women make application at the Dispensary in the latter months of gestation, are entered in the large application-book, under a serial number, and are given cards correspondingly numbered.

Care during Pregnancy

It is impossible, for financial reasons, to give all the pregnant women all the care that women in such condition should get. There are on the books about 350 waiting cases all the time. Examinations of the urine are made only in suspected cases, and in women who have had urinary trouble in previous pregnancies.

Owing to the immense amount of post-partum work required of the internes and students, it is impossible to make routine pelvic mensuration in all cases, but the nurse issuing the application-card to the patient makes regular inquiries into the history of her previous labors, and, in cases of primiparæ, refers small or deformed women to the Wednesday and Saturday clinic of the writer. Thus far very few cases of contracted pelvis have escaped detection. The women, however, will not follow the advice we give, with the purpose to avoid complications at labor, preferring to take their chances at term than to allow us to induce labor before it.

Latterly, the applicants have been supplied with a printed set of rules, reproduced herewith. The results cannot yet be determined, but they should be good.

In some of the cases a pregnancy-blank is filled out, and the writer hopes that the means of the institution will ultimately allow such a blank to be filled out in all pregnancy cases.

At present the patients are instructed in the fundamental rules of the hygiene of pregnancy by the nurse issuing the application-card, and referred to the clinic for further attentions.

During Labor

When labor begins, the application-card is sent to the Dispensary, or its number is telephoned there. An interne, *one* student, and if possible a nurse, are sent to the home of the patient. A satchel is taken along, which contains everything needed for a normal labor. (See card.)

Below has been added a list of these articles. The table is arranged as shown on page 806, so that everything is convenient and can be found readily in an emergency.

LIST OF CONTENTS OF LABOR-BAG

Center of Bag

2 granite pans, about 1 quart size.
1 granite pan, about 1 pint size.
2 clean towels.
1 pair clean leggings.
1 jar cotton pledgets.
1 jar pads with 1 cord dressing.
1 douche-can, with tube and point, sterile.
2 sterile hand-brushes.
1 tin sterile green soap.
1 tracheal catheter.
1 pelvimeter.
1 labor record, child's record, and birth-return.
1 fresh newspaper.
1 box rubber gloves.

End Pockets

1 scissors.
1 artery-forceps.
1 baby-scale.
1 steel measuring-tape.
1 bottle sterilized linen bobbin for tying cord.
1 bottle one-per-cent silver nitrate solution, with dropper.
1 bottle boric acid solution.
1 bottle lysol.
1 bottle bichloride tablets.
1 bottle extract ergotæ fluid.

On arriving in the house the interne first acquaints himself with the general condition of the patient and the probable rapidity of the labor. If labor is just beginning, he orders an enema given, and after it has acted he prepares the woman, or if the nurse is present, she does this. The pubic hair is closely clipped and then the patient is washed with soap and water from the ensiform to the knees, and after this with 1 to 1,500 bichloride.

The antiseptic solution is used liberally all over the parts, especially the vulva, but no douche is given.

The bed is dressed with the cleanest linen the house affords, and the patient dons a clean night-gown and wrapper.

Newspapers, clean, and, if possible, fresh from the press, are used under the patient. If there is a supply of towels or sheets, these are placed over the newspapers, but we have found the papers a very useful and satisfactory substitute.

The room is cleared of all unnecessary furniture, bedding, chicken-coops, domestic animals, and litter of all sorts. A side-table or bureau and two wooden chairs are retained. The satchel remains on the kitchen-table, and its contents are spread on the clean newspaper mentioned in the list. Before handling anything in the satchel, both student and interne wash the "street dirt" off their hands. The bureau and chairs on which rest the basins with solutions, cotton-jars, etc., are covered with newspapers, for the double object of keeping these clean and to avoid injuring the furniture of these indigent people. In the absence of a bureau or side-table, two chairs with the ironing-board or a table-board across them answer the purpose admirably.

After the patient is thus prepared, the interne begins the labor record (q. v., p. 808), and having obtained the general information required, proceeds to the external examination. There is a certain method in the performance of this examination, as indicated by the order of the points on the labor record, and the interne must follow this order and teach it to the student. It is fundamental to the technique of the whole system em-

ployed in the Dispensary and the Hospital, and also in the writer's own practice.

In the abdominal examination the interne determines, and demonstrates to the student and nurse, the presentation and position of the child, the nature of abnormalities, the heart tones of the fœtus, and the strength and action of the pains. The size of the child is estimated and noted, then the pelvis is measured, and the general relations of the one to the other are compared and discussed. Now the parturient is prepared for the internal examination.

Near the bed are placed two pans with solutions, one with one-per-cent lysol, the other with 1-1500 bichloride of mercury. The patient is brought near the edge of the bed, the covering drawn down, and, if there is such in the house, a clean sheet is used to cover the patient. In the absence of a sheet, a clean newspaper or a towel is used. The rules for washing the hands, given on page 815, are rigidly observed by both interne and student, and are repeated before each and every examination. The rubber gloves are boiled in plain water for ten minutes and drawn on, wet, after the hands have been sterilized. This is not the writer's method of using gloves, but is necessary in the Dispensary practice. We have not facilities to furnish dry sterile gloves. The dry glove, drawn on over the sterile hand, dried and powdered, is, in the writer's opinion, the ideal method. It is practicable only in hospitals and private practice.

In making the internal examination, the points of information are obtained in the order given on the labor record, the reasons for this being for asepsis and system, which avoid the possibility of overlooking important features. The student is now allowed to make an internal examination, under the guidance of the interne, who coaches him and tells him how to find all the structures, etc. The importance of the internal examination is impressed on the student, and he is shown how it is possible to conduct a labor without frequent vaginal exploration.

The progress of the labor is carefully observed by the interne and student. Frequent *external* examinations are made, and the fœtal heart tones counted at least every hour. The interne describes the mechanism of labor to the student as the phenomena of the function unfold before their eyes, and the labor is discussed from all points of view. These colloquia at the cases are of utmost value to student and nurse, and pass the otherwise profitless time of "watchful expectancy" in a most interesting and profitable manner.

The blank reproduced here is filled out and sent to the Dispensary. These blanks keep the office informed of the condition of all women in labor. A blank is also filled out and sent or telephoned to the Dispensary *immediately* on the discovery of any abnormality in the labor.

No internal examinations are made now unless there is some indication, like delayed labor or abnormality in the presentation or position, until the second stage begins. After the membranes rupture, an examination is always made, to determine the degree of dilatation and a possible prolapse of the cord.

The interne, the nurse, and the student stay with the parturient, unless the labor is very slow, in which case the interne returns to the Dispensary for a few hours. *No case is left entirely in charge of the student; all deliveries are attended by the interne.* This necessitates the employment of five internes, and is expensive, but it is the only legal, the only just way of doing obstetrical work.

As the second stage draws nigh, the bed and room are prepared for the delivery. Fresh newspapers replace the soiled ones under the patient, fresh antiseptic solut ons are made up, the scissors, artery-forceps, and tape are laid in the lysol solution, and all arranged, with a jar of cotton pledgets, on the side-table as before described. The interne's gloves are reboiled for the delivery. The leggings are put on the patient and she is brought to the edge of the bed, on her side, toward the best light. All patients are delivered on the side, as this is more cleanly, easier to manage in the low beds, which sink deeply in the middle, and perineal lacerations are more easily prevented and detected.

During the second stage the vulva and surrounding area are liberally sponged with both lysol and bichloride solutions. The practice of the institution is antiseptic. We attain asepsis by antisepsis, and the writer ascribes the freedom of our patients from puerperal infection to the use of rubber gloves and the antiseptic treatment of the external genitals. In over seven thousand consecutive cases of labor, only one puerpera has died of infection, and fever cases are rare. These results were obtained in the most unfavorable surroundings, amid filth, and often infection. The principle of the "limitation of the field of asepsis" is practised rigorously. By this is meant that the smallest number of hands, of aseptic basins, of towels, of instruments, enter into the conduct of a case, and that only the vulva and the area *immediately adjoining* are considered aseptic, and both are frequently drenched with antiseptic solution.

The writer believes that most large operating-rooms err in this regard. Too many basins, too many instruments, too many towels, too many hands (assistants and nurses), too many tables,

CHICAGO LYING-IN HOSPITAL AND DISPENSARY

.....STATION

Diagnosis.....Confinement No.....Application No.....No. of Cards.....

LABOR RECORD

Name of patient .....Date of application.....190....

Address.....House.....Floor.....Front / Rear Entrance.....

Birthplace.....Married. Single. Widow. Age.....Para.....Religion.....

Previous diseases, date of each.....

.....Signs of rachitis?..... First walked .....

First menstruation (*age*).....Character of menstruation { *irregular* / *regular* / *profuse* / *scanty* / *duration* / *pain* } .....

Family history .....

Character of previous pregnancies, labors, puerperiums.....

.....

.....Miscarriages { *number* / *month of pregnancy* } .....

First labor (*at what age*).....Last labor (*date*).....Last menstruation { *duration* / *date* / *quantity* } .....

Quickening (*date*) .....Health in present pregnancy.....

Month of gestation.....Urine { *normal* / *albumin* / *sugar* / *casts* } .....Bowels.....Œdema .....

PREPARATORY STAGE

Date (*began*).....190....Hour.....M.

Sinking of the Uterus (*Lightening*) { *effect upon abdomen* / *effect upon chest* / *effect upon bladder* / *effect upon rectum* } .....

.....

Uterine contractions { *pain* / *frequency* } .....Show { *date* / *character* / *amount* } .....

Cervix { *effacement* / *condition* / *secretion* } ..... External os { *dilatation* / *presenting part* } .....

FIRST STAGE

Date (*began*) { *observed* / *patient's statement* } .....190.....Hour..... A.M. / P.M. Arrival of attendant (*date*)..... A.M. / P.M.

Position of parturient { *walking* / *dorsal* / *lateral* } .....Frequency of pains.....

Character of cry.....Temperature.....Pulse { *rate* / *quality* } .....

EXTERNAL EXAMINATION. Ovoid { *longitudinal* / *transverse* } .....Over inlet.....In fundus.....

Back.....Small parts.....Shoulder.....Tumors, etc.....

Height of fundus.....PRESENTATION.....POSITION.....

Uterine contractions { *strong* / *weak* / *tetanic* } .....Round ligaments { *course* / *tense* / *tender* } .....

Engagement of presenting part { *movable* / *fixed* } .....Estimated weight of child.....

AUSCULTATION. Fœtal heart (*rapidity*).....(*regularity*).....(*position*).....

Funic souffle { *position* / *quality* } .....Uterine souffle { *position* / *quality* } .....

PELVIS. Interspinous ..... Intercristous ..... Bitrochanteric ..... Baudelocque ..... Circumference ..... Conjugata diagonalis .....

Sacrum { *outside* / *inside* } ..... Pubis ..... Stature ..... Height ..... cm.

INTERNAL EXAMINATION { *number* / *by whom* } ☐ ☐ ☐ ..... Disinfectant .....

1. Cervix (*effacement*) ..... Os { *size* / *dilatability* } ..... Edge { *thick* / *hard, etc.* } .....

2. Membranes { *intact* / *spontaneous rupture* / *artificial rupture* } (*time*) ..... Liquor amnii { *clear* / *meconium* / *amount* } .....

3. Engagement of presenting part ..... 4. Soft parts { *lacerations* / *scars* / *tumors* } ..... Perineum .....

5. Sacrum ..... Ischiatic spines ..... Conjugata diagonalis ..... Conjugata vera .....

Hemorrhage ..... Vaginal secretion ..... Bladder ..... Rectum .....

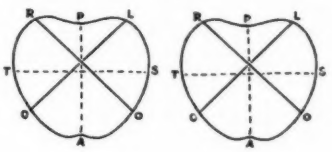
Second internal examination { *by whom,* / *reason for* / *time* } ..... FINDINGS .....

.....

General observations { *character of pains* / *rate of progress of labor* / *condition of mother* / *heart tones of baby* } .....

.....

.....



SECOND STAGE

Date { *began* / *observed* } ..... 190.... Hour ..... A. M. / P. M. Attendance { *names* / *time of arrival* } ..... A. M. / P. M.

Position of patient { *walking* / *dorsal* / *lateral* } ..... Bladder ..... Rectum ..... Hemorrhage .....

EXTERNAL EXAMINATION. Ovoid ..... Inlet ..... Fundus ..... Back .....

Small parts ..... Anomalies ..... Character of cry .....

Uterine contractions { *severe* / *weak* / *frequency* } ..... Engagement of presenting part { *movable* / *fixed* / *deep* } .....

AUSCULTATION. Fœtal heart (*number*) ..... (*regularity*) ..... (*position*) .....

Funic souffle ..... Uterine souffle ..... Pelvis (see ***First Stage***) .....

INTERNAL EXAMINATION. (*By whom; time*) ..... Disinfectant .....

Cervix (*effacement*) ..... Os (*size*) ..... Edge { *thick* / *thin* / *hard, etc.* } .....

Membranes { *intact* / *spontaneous rupture* / *artificial rupture, by whom* } (*time*) ..... Liquor amnii { *clear* / *meconium* } .....

Engagement of presenting part { *movable* / *in pelvis* / *at outlet* } ..... Position of presenting part { *sagittal suture* (>——<) / *genital furrow* (>——) / *facial line* (——) } .....

Soft parts ..... Pelvis (see ***First Stage***) .....

SECOND EXAMINATION { *reasons for* / *by whom* / *time* } ..... Findings .....

.....

General observations { *character of pains* / *progress of labor* / *condition of mother* / *heart tones of baby* } .....

.....

DELIVERY { *spontaneous* / *instrumental* / *after-coming head* } .....

Shoulders (*diameter in which they are delivered*) ..... TIME OF DELIVERY ..... A. M. / P. M.

Protection of the perineum { *side* / *back* } ..... Laceration .....

Cord around neck ..... (*treatment*) ..... Chill .....

ANÆSTHETIC { *ether* / *chloroform* / *morphine* / *chloral* } ..... (*when begun*) ..... { *length of time* / *amount used* } .....

Effect on pains { *regularity* / *frequency* / *power* } .....

Degree of anæsthesia { *surgical* / *obstetrical* } .....

BABY. Condition ..... Sex ..... Weight ..... Length ..... cm. Mature? .....

THIRD STAGE

After-pains { *frequency* / *severity* / *hemorrhage* } .....

Uterus (*position*).....(*consistency*).....Rises in abdomen { *how far* / *side* / *when* } .....

Cord advances { *how far* / *time* } ..... Hemorrhage { *amount* / *massage* } .....

Expulsion of placenta { *spontaneous* / *early expression* / *Credé expression* } .....Time.....

Method of treatment of third stage..... Hemorrhage after third stage .....

Vaginal manipulations { *reasons for* / *by whom* } .....

Placenta (*complete?*) { *condition* / *weight* / *size* / *calcareous* / *succenturiata* / *fibrous* / *fatty* / *marginata* / *infarcts* } .....

Draw shape here.

Retroplacental blood-clot { *size* / *position* } .....Estimate of amount of blood lost .....

Cord (*length*).....cm. (*insertion*).....Anomalies .....

Membranes { *amnion* / *chorion* } (*complete?*).....(*opening*).....(*thick*).....

Uterus after delivery of placenta (*condition*).....(*height*).....cm.

Length of third stage.....hours.....minutes. Conducted by.....

Perineum { *intact* / *lacerated* / *operation* } .....Ergot? { *amount* / *time* / *reason for* } .....

SUMMARY OF LABOR

LENGTH OF FIRST STAGE.....hours.....minutes. SECOND STAGE.....hours.....minutes. THIRD STAGE.....hours.....minutes.

Temperature.....Pulse (*observed one hour after labor*).....Uterus { *height above pubis* / *consistency* / *position* } .....

Delivered by.....Assistant.....Others present { ..... / ..... }

COMPLICATIONS OR OPERATIONS

.....

.....

RECORD OF THE PUERPERIUM [1]

Date.....190... .....day. Signatures.....

1. Patient feels..... 2. Sleep..... 3. Bowels.....
4. Bladder..... 5. Stomach (*diet*)..... 6. Countenance.....
7. Tongue..... 8. Temperature, A.M.....P.M..... 9. Pulse, A.M.....P.M.....
10. Breasts (*condition*).....(*secretion*).....(*nipples*).....
11. Uterus (*height above pubis*)..... (*condition*).....(*after-pains*).....
12. Abdominal tenderness..... 13. Genitals (*condition*).....
14. Lochia (*quantity*).....(*character*).....(*odor*).....
15. Treatment — Remarks.....

.....

[1] Ten of these blanks are printed on the sheet. One is to be filled out each day.

CHICAGO LYING-IN HOSPITAL AND DISPENSARY

Application No.....Confinement No.....No. of cards.....

RECORD OF CHILD

Name of mother.....Address.....Para.....
Previous history of mother.....
Condition during pregnancy.....
.....Month of gestation.....
LABOR. Character { *easy* / *tedious* / *painful* / *instrumental* } .....Presentation and position .....
Date of child's birth.....190.... A. M. / P. M. Duration of labor.....hours.....minutes.
Time of ligation of cord.....minutes. Treatment of eyes.....
Primary respirations { *normal* / *delayed (how long)* / *superficial* / *obstructed* / *absent* } Treatment .....
Capillary circulation { *normal* / *congested* / *anæmic* } .....Temperature (*just after birth*).....
GENERAL CONDITION. Living.....Asphyxiated { *mild* / *severe* } .....Still-born.....Not viable.....Macerated.....
Sex.....Development.....Fat.....Cry { *vigorous* / *weak* / *whining* } .....
Skin.....Vernix caseosa.....Lanugo.....
HEAD. Configuration.....Ossification.....
Size of fontanels.....Sutures.....Injuries.....
Caput succedaneum { *location* / *size* } .....Cephalhæmatoma.....

MEASUREMENTS

Length.....cm. Weight.....lbs. DIAMETERS. Biparietal.....cm. Bitemporal.....cm.
Suboccipito-bregmatic.....cm. Occipitofrontal.....cm. Occipitomental.....cm. Bisacromial.....cm. Bisiliac .....cm.
Right oblique of head.....cm. Left oblique of head.....cm.
CIRCUMFERENCES. Suboccipito-bregmatic .....cm. Occipitofrontal..... cm. Bisacromial.....cm. Chest.....cm.
REMARKS. Anomalies.....
.....
.....
.....
Delivered by.....

SUBSEQUENT RECORD[1]

Date.....190 .....day. Signatures.....
Sleep ..... Nursing..... Cry.....
Eyes..... Skin (*color; eruption*)..... Breasts.....
Umbilicus { *cord off* / *pus* } .....Genitals .....
Stools (*number; color*).....Urine .....
Temperature.....A. M.....P. M. Remarks.....
.....

[1] Ten of these blanks are printed on the sheet. One is to be filled out each day.

enter into the *sterile* field of work. The number of articles to be sterilized is so large that the chances of infection are magnified. The principle of the bacteriological laboratory should prevail in the operating-room: the absolute sterility of the few articles that come in direct contact with the wound. While all things else are sterilized, they should not come in contact with the wound.

In the Dispensary service, instruments for operative delivery are sent to a case only after the interne has decided that intervention is necessary, and thus the percentage of operative deliveries is small — not over four per cent.

The second stage of labor not seldom lasts three or four hours, and only a few times has a child been lost as the result of this waiting policy. The internes are instructed to watch both mother and fœtus carefully throughout labor, and report at once to the director if either seems to be in immediate or prospective danger.

The principles for protection of perineum are:

1. Deliver on the side.
2. Retard descent till the elasticity of the perineum is fully developed.
3. Deliver the head in forced flexion, but don't press on the head through the perineum. All pressure is applied to the head directly.
4. Deliver between pains.

The anus is kept in sight throughout, not covered with a pad; and any escaping fæces or mucus is promptly sponged away with cotton soaked in one-per-cent lysol.

After the head is delivered, the parturient is turned on her back for the delivery of the trunk. The student is now given the control of the uterus, with instructions not to massage it, but simply to note its consistency and action.

When three or four minutes have elapsed, or when the pulsation in the cord near the vulva begins to weaken, it is tied and cut about one fourth inch from the skin. The child is wrapped in a warm diaper and blanket and placed near the stove.

The interne demonstrates the physiology of the third stage to the student and nurse. Both watch this part of the labor, noting the occurrences and abnormalities on the history-sheet. We teach that the third stage is as important as the two others combined. More women die in the third stage.

The treatment of the placental stage by the Dispensary is not the active Credé, nor yet the passive expectancy of Ahlfeld. Experiments by the writer in this practice have shown that neither course meets the conditions. A "modified expectant plan" is employed, and the results are good, as we have never lost a case from post-partum hemorrhage, and the number of placenta removals is very small — less than half of one per cent — and the number of severe hemorrhages is also small. Disturbances in the puerperium due to errors in conduct of the third stage have seldom been noted.

In brief, this is the method of conducting the third stage: As the trunk of the child is passing the vulva the assistant's hand follows down the receding uterine tumor; if the uterus does not contract well, this hand gives it a gentle, evenly distributed massage. As soon as the uterus contracts, the hand is allowed only to rest smoothly on the fundus, to give information of its action. If there is no external hemorrhage, if the uterus remains firm, retracted, does not balloon out with blood, nothing is done. Note is made of the advent of after-pains, uterine contractions, and their effect on the size of the uterus, the hemorrhage, the separation of the placenta, and also of their frequency. Unless there is some indication to interfere, thirty minutes are allowed to elapse before trying to express the placenta. If the signs of separation of the placenta and its extrusion into the lower uterine segment are positively present, the interne is allowed to express the placenta a few minutes before this time. These signs are, the advancement of the cord, the rising of the uterus upward toward the liver, the change in shape of the uterus, from globular to a flattened ovoid, with a sharp fundus, and the presence of a soft boggy mass above the pubis. The change in the tension of the blood in the cord is also noted. When the interne believes the placenta is loosened and lying in the upper vagina and cervix, he asks the woman to bear down, which failing to bring the placenta, he practises "early expression." He waits for an after-pain, brings the uterus to the middle line, having made sure that the bladder is empty; then using the contracted uterus as he would a ball, he presses the placenta out of the vagina with gentle, steady pressure. If the operation is unsuccessful, he has made a mistake in the diagnosis, and waits twenty minutes before making another attempt. If the second attempt fails, then a Credé expression is tried. In this maneuver the uterus is grasped in the whole hand, and, pressing down as in "early expression," the fingers and thumb are squeezed together, forcing the placenta out "like the pit from a cherry." It is rare that a second Credé is needed. In such cases the third stage is abnormal.

If hemorrhage, either external or internal, occurs, the labor is regarded pathologic, and the above method is altered. The uterus is massaged briskly till firm contractions are produced, and if the bleeding continues, the uterus is emptied, by Credé, or, if absolutely necessary, by hand. As was said, such cases are rare.

The membranes are not twisted into a rope, the writer believing that this cuts off the tender chorion, but are *slowly* drawn from the uterus by gentle traction. Sometimes five minutes are consumed in extracting the membranes. Pieces of retained membrane are not removed, unless they give rise to hemorrhage. If a piece of placenta is missing, it is always removed then and there. The antiseptic precautions for such removal, and indeed on all occasions when the uterus is entered, are redoubled. After the delivery of the placenta, with few exceptions a dram of ergot is administered.

The perineum is now cleansed with an antiseptic solution and inspected very carefully for injuries. Tears deeper than half an inch are sewed up, and the event is made a regular operation.

A roller-towel is improvised for an abdominal binder, a sterile pad is laid over the vulva, the bed is dressed with a clean sheet, and the patient is given a hot drink.

The infant is not bathed, as the facilities for an aseptic bath are never at hand, and also because bathing chills it too much. It is laid on a pillow on a table, near the stove, and oiled all over with warm olive-oil. This is wiped off with a clean towel, then the cord is washed with one-per-cent lysol and dressed with dry sterile gauze pledgets. No powders are used. The eyes are carefully treated from the moment the face is born. First, the face, forehead, and eyelids are wiped clean with cotton pledgets wrung dry out of one-per-cent lysol solution; then the lids are flushed with boric acid solution from the bottle; then after the child is dressed, a drop of one-per-cent nitrate of silver solution is put in each eye, followed by salt solution. Great care is exercised to keep all foreign matter out of the eyes, in delivery and in dressing infant. An infected eye does not occur once a year; that is, in twelve hundred cases.

Before leaving the house, the interne must see to it that the following points are noted:

1. That the uterus is firmly contracted and in normal position;
2. That there is no hemorrhage, either internal or external;
3. That the placenta is positively complete;
4. That all perineal tears are attended to;
5. That there is no hemorrhage from the infant's cord;
6. That both mother and babe are in good condition.

He takes pulse and temperature of the mother, inquires if she has headache (eclampsia), and, in general, satisfies himself that everything is right.

To attend to all these duties, fill up the history-sheet, and repack the satchel requires all of two hours after the child is born, which gives ample time for the early complications, if any, of the puerperium to occur.

On his return to the Dispensary the interne turns the labor-satchel over to the nurse for resterilization and refilling, then enters his return on the card, with the nature and mode of termination of the case, finally stamping it with the time-stamp.

Care During the Puerperium

The post-partum work is considered of equal importance to any other in the service, and careful attention is given the women and babes during this period. The students and nurses are taught to observe the physiological phenomena as they develop in the puerpera and the infant. Knowing the normal conditions, they will be able to recognize the pathological. Puerperal complications are so rare that very few students have the opportunity to study a case of infection or mastitis.

The interne teaches the student what to do and what to observe during the post-partum call, and the nurse shows him how to oil or bathe and dress a baby.

Daily visits are made for nine days, and on the eleventh day the patient is discharged, unless there is present some complication connected with the obstetrical side of the case.

At each visit the points numbered on the post-partum record (q. v., p. 810) are elicited and noted. The student thus learns what he should look for in a puerpera. Then the patient is dressed antiseptically and a new pad put over the genitals. Before touching the genitals the student removes the soiled pad or cloth, arranges the patient and bedclothes so that he can reach the genitals handily, and lays a folded newspaper under the buttocks. Then he arranges the basin with 1-1500 bichloride and has the jar of cotton sponges open, near the bed, after which he sterilizes his hands. Gloves are worn if there is an extensive laceration, if the lochia are fœtid, and invariably in infected cases. After the antiseptic bathing of the genitals, a new pad is applied and the T-binder readjusted. The nurse combs the patient's hair and performs other nursing duties for her, such as a full bath, changing the bed, the enema, etc. In the absence of the nurse, the interne or the student does the best he can with such attentions. Under no circumstances is the interne allowed to give douches or to make internal examinations.

The breasts are supported with a roller-towel or breast-binder. They are washed with soap and water the first day; after that the nipples are bathed daily with boric solution. The patient is instructed how to give them cleanly care, but

much cannot be expected of this class of patients. That even this care and advice accomplish a great deal may be deduced from the fact that mastitis is very rare, and when it does occur, it is usually several weeks after the patient is discharged.

The bowels receive close attention during the puerperium, as they have much to do with the smooth recovery of the patient. About forty-eight hours after delivery, one ounce of castor-oil is given. Every day thereafter, at least one alvine evacuation is procured, either by enemata or cascara.

The diet is simple; liquids for twelve hours, semi-solid for a day, then a light diet being ordered. It is impossible to carry out a regimen looking toward the avoidance of infantile colic. The women will eat everything, and often nurse the infant whenever it cries. The rule given for nursing the baby is to do so every two hours during the day and every four hours at night. The patient is allowed to sit up in bed from the seventh day on; she gets up in a chair on the ninth or tenth day, and is allowed to walk around the room as soon as she feels strong enough. In particular cases these rules are modified.

The infant is put to the breast six or eight hours after labor. It is given only water till the milk comes. When the mother is given castor-oil, the infant also receives ten drops as a routine practice.

The navel is dressed daily, with sterile hands. The old gauze is soaked off in 1-1500 bichloride, the stump washed with the same, dried, and dressed with sterilized gauze. No powders are used. If the cord is moist or fœtid, it is dressed with fifty-per-cent alcohol for a few days.

The infant is not bathed until a day after the umbilical stump has healed over. In the mean time it receives a daily olive-oil rub. The head, hands, and buttocks are washed with soap and water from a basin. In summer the oil sometimes macerates the skin, wherefore a sponge soap-and-water bath is then substituted.

The mouth is washed once daily with boric solution, as also are the outsides of the eyelids.

It will be noticed that the care of both mother and babe has been much simplified, the keynotes being cleanliness and non-interference.

If a puerpera has a rise of temperature, the director is notified at once, and if the symptoms point to the genitals, the following is the routine treatment: 1. An ounce of Epsom salts, followed in a few hours by an enema. 2. Fifteen drops each of Squibb's fluid extract ergot and hydrastis canadensis every four hours. 3. Liquid diet.

A sharp investigation of the labor is now made, to determine who delivered the patient, the number of internal examinations, and the condition of the placenta and membranes. If the uterus is, in all probability, empty, no local treatment is instituted. General medical treatment is employed. If there is real suspicion that a piece of placenta has been retained, the uterus is cleaned out with the finger. This operation has been done only twice in the twelve years' existence of the Dispensary. The fever almost invariably subsides in a few hours or days without treatment. It is this experience that brought the writer to look askance at all reports of the successful treatment of puerperal fever by means of douches, curettage, etc. Our women get well quicker without such interference.

Engorged breasts are treated by the ice-bag, restriction of liquids in the diet, and a tight breast-binder. Incipient mastitis, evidenced by pain in the breast, chill, fever, etc., is treated very rigorously. The babe is removed from the breast, the organs are bound up firmly with a compression binder, the mother is given a whole bottle of effervescent liquid citrate of magnesia, and three ice-bags are applied to each breast for forty-eight hours. With this treatment, only exceptionally will the inflammation go on to abscess.

For cracked nipples, two-per-cent nitrate of silver solution is applied in the A. M. and P. M., and Wansbrough's lead nipple-shields are worn.

THE HISTORY-SHEET

The labor records and the post-partum records are kept in the office. Every night the clerk extracts from these the condition of mother and babe, entering these points on his "morning report" for the inspection of the head nurse, the internes, and the medical director. These reports are preserved, and help to verify and supplement the other records of the case. The history-sheets, when completed, are all copied by the students on clean white blanks for the purpose of permanent binding. This copying of the records also fastens in the minds of the students the essential points of our obstetrical techinque. The bound records are preserved at the Hospital, and are accessible to the medical profession.

The following rules are printed for the use of the internes and patients:

Rules for Pregnant Women

1. A woman who is pregnant should consult her physician as soon as possible, so that anything in her case that is not right may be corrected. If she cannot afford to have a physician care for her during confinement, she may obtain proper care from the Dispensary, 302 Maxwell Street, Chicago.

2. If the woman has had instruments used, or a hard time, at any previous labor, or if she is small

or deformed, she should ask the doctor to "measure her" and to see if she is in good condition to have a baby.

3. She should report to the Dispensary if she has *too much headache, vomiting, trouble with her eyes, swollen feet or eyelids, bleeding from any part of the body, or too much pain.* If she does not pass enough water (urine), she should bring a sample to the Dispensary for the doctor to examine.

4. She should eat meat only once a day; she should not drink tea or coffee more than once a day; she should eat fruit, vegetables, cereals, breadstuffs, and butter, and she should drink plenty of water (boiled and cooled), milk, and buttermilk.

5. She should bathe at least once a week, and take care not to catch cold. Her dress should be warm. She should not wear tight bands around the belly, nor round garters.

6. She must see to it that her bowels move every day. This is very important.

7. She must go out and walk in the fresh air every day.

8. When the labor pains begin, or if the "waters" should break, send at once to the Dispensary for a doctor. Have ready a bundle of *clean* newspapers and a kettle of hot water. Before the doctor comes, take an injection of soap and water to clean out the bowels.

9. Allow the doctors to carry out the rules prescribed by the Dispensary for treatment of patients.

10. This Dispensary is intended only for the poor women who cannot afford to pay a private doctor for care during confinement. It is supported by charitable donations, and those of the patients who can afford it should give as much as they can. The money will be used to pay for those who are absolutely destitute, and a receipt will be sent by mail.

PREPARATION OF THE HANDS FOR OBSTETRIC CASES

General Rules

1. Keep the hands aseptic as far as possible by avoiding direct contact with infective matter. Use rubber gloves.

2. After all dissections, dressing pus cases or erysipelas cases, or touching the lochia of puerperal cases, sterilize the hands immediately.

3. After attending diphtheria or scarlet fever cases, etc., change clothing, bathe, and shampoo head and beard.

MODE OF PROCEDURE

1. Coat off; sleeves rolled up above elbow.

2. Wash hands for two minutes in running water, working the soap well under finger-nails and into all creases.

3. Pare and clean finger-nails carefully with blunt instrument. Nails not longer than 1 mm.

4. Prepare patient.

5. Scrub in running water or frequent changes for five minutes. Open out the creases and be sure to scrub well under nails. Rinse and dry.

6. Make external examination.

7. Prepare two solutions, near the bed: 1-1500 $HgCl_2$, 1% lysol.

8. Scrub for five minutes, as before.

9. Wash hands in the lysol solution.

10. Draw on sterile rubber gloves. These gloves must be perfect, and are to be boiled for ten minutes. Do not touch fingers of glove with bare hand.

11. Wash vulva with bichloride solution, then with lysol solution, leaving a bit of soaked cotton in the introitus.

12. Now wet hand in lysol solution and make the internal examination. Be sure the fingers touch nothing on the way. Separate labia widely.

PREPARATION OF THE PATIENT (POINT 4)

1. Clip pubic hair closely.

2. Scrub thoroughly from ensiform to knees, using much soap, giving special care to the genitals.

3. Wash from ensiform to knees with 1-1500 bichloride, paying special attention to pudendal region.

4. Put on clean nightgown and wrapper.

REPORT BLANK, CHICAGO LYING-IN HOSPITAL, —— DISPENSARY SERVICE

[When sending or telephoning to the Dispensary for assistance or advice, internes must always use and fill out this blank.]

Date.....o'clock.....M.

Name of patient.....

Address ..... Rear Front House.....Floor Rear Front

Para..... Month of pregnancy....Age.....

Duration of first stage .... Second .... Third....

Pulse.....Temperature ..... Bladder.....

Presentation..... Position .....

Fœtal heart tones: *Rate .. location .. regularity ..*

Membranes: *Intact ..... ruptured. Time .....*

Cervix: *Effaced*.....Os: *Admits*.....

Presenting part: *Engaged*.....*At outlet*.....

Pelvis: *Measurements*.....

Character and frequency of pains.....

.....

General condition of mother and baby.—Remarks

.....

.....

.....

.....

.....Attendant.

EDITORIALS

SURGERY, GYNECOLOGY AND OBSTETRICS

SURGICAL PUBLISHING CO. OF CHICAGO
103 STATE STREET - - - - - CHICAGO

SUBSCRIPTION PRICE, FIVE DOLLARS PER ANNUM IN ADVANCE

Managing Editor - FRANKLIN H. MARTIN, M. D.
Associate Editor - ALLEN B. KANAVEL, M. D.

DECEMBER, 1906

SURGERY, PAST, PRESENT, AND FUTURE

In the modern redevelopment of learning and the arts, surgery has come to be recognized as a combination of art and science. In the old days the literature of surgery was confined for a long time to the writings of the Hippocratic and Galenic authors, to add to which was heretical. The contributions to literature of new observers and thinkers could obtain currency only a long time after their death, by a sort of canonization process.

Hence the surgical art, in the absence of a surgical science, was supreme. Indeed, so little did surgery recognize anything more than craftsmanship, that the medical man looked with contempt upon his surgical brother — with such contempt, that modern science has scarcely sufficed to dissipate it.

Such of the vital problems of surgery as involve merely mechanical modifications of the living tissues were, in the upspringing of science, relatively easy to solve. Hence surgery, which, in the days of Dieffenbach, had hardly advanced beyond the crude methods of Ambroise Paré, sprang, under the leadership of such modern heroes as von Pitha, Billroth, Ollier, and Lister, to a pre-eminence over medicine that long dazzled and attracted the most brilliant minds entering the profession.

The *autopsia in vivo* of the aseptic surgeon has rightly led the modern operator to put aside the excessive insistence of his immediate predecessors upon that manual facility upon which the workers in the pre-anæsthetic days laid stress. Leisurely dissection took the place of bold, destructive, but rapidly completed and easily healing incisions.

It is true that the graceful and facile operators of the French school have ever appreciated their manual dexterity, and both Langenbeck and Billroth have lauded technical excellence.

It must be admitted by all that there are in abundance those who lay too much stress on the principle of cutting and tying whatever bleeds. On the other hand, there is a goodly array of those who scorn dexterity, brief anæsthesia, elegance and grace of manipulation, and — may one dare say it? — a continually lessening mortality, feeling that if the patient meet Charon, a crude wound may prove the passport obolus if only it give evidence of pathological knowledge on the part of its maker.

But why may we not cultivate both fields of effort? Why need we be divided into hostile camps of technicists and theorists, sticking tongue in cheek against each other? Surgeons, in their role of pathologists, have gone too far in their desire to solve all morbid anatomical mysteries during operation.

In no country more than in America does the surgeon give such consideration to the welfare of the patient immediately concerned in an operation. Yet even here there is room to urge the study of accuracy of preparation, promptitude in operating, and quickness in deciding questions of morbid anatomy. And we may further insist, that it is morally wrong for the surgeon to gratify curiosity as to morbid conditions by unduly prolonging anæsthesia, by making incisions too numerous or too long, or by manipulating tissues or organs too freely.

We predict that the theoretical training of the operators of the immediate future will be more rigid than has heretofore been customary, so that morbid conditions will be more quickly and accurately recognized, with the result that the art of surgery may be practised with freer grace, more confident and masterly elegance, and with results more satisfactory as to cosmetics, function, and mortality.

WELLER VAN HOOK, M. D.

BIBLIOGRAPHIES

American medical journalism is yet in its infancy, but with the scientific training of students and the careful attention given in private and public clinics to the observation of cases and the recording of histories, it is not too much to say that in the next few years the output of highly scientific articles will place the literature of American surgery on a plane inferior to none.

In this connection it may be mentioned that contributions of great merit often lose much of their value because of incompleteness. For instance, we too often see excellent articles marred by incomplete bibliographies, which begin and end nowhere. This, also, often detracts from an otherwise acceptable contribution. A bibliography should either be complete or no attempt made at presenting one, although foot-notes may be added, giving accurate references. It should be the pride of each author, when gathering the authorities on any subject, to cover the field so completely that, after his contribution has appeared, subsequent articles need discuss only the advances that have been made since its publication. On the other hand, when a complete bibliography has been made, one should be careful not to stultify his remarks by the repetition of what has already appeared, but should refer the reader to the article with the bibliography for previous authorities. In the past there has been too much repetition, both in articles and bibliographies. This is perhaps excusable, since the work already done has often been incomplete.

It is well to remember that the journals and books of the Surgeon-General's Library in Washington may be procured on payment of a nominal sum, and if the catalogue of the library is not at hand, by writing to the librarian, or to any large medical library (as the Newberry, at Chicago), a complete bibliography on any subject will be compiled by a library assistant at the cost of the work done.

We cannot emphasize too much the importance of the proper method of reporting references. In every case the author, the title of the paper, the year of publication, and volume and page, should be given. This is particularly important in references to foreign contributions. By so doing, study on the part of subsequent investigators is greatly facilitated. The completed work should be transcribed with the greatest care, since magazines presume that the work has been properly verified, and follow the copy furnished.

By a strict adherence to these rules mistakes would be minimized, much labor on the part of subsequent authors avoided, and the value of American medical literature greatly enhanced.

TRANSACTIONS OF SOCIETIES

TRANSACTIONS OF THE CHICAGO SURGICAL SOCIETY

A regular meeing was held November 2, 1906, with the President, Dr. D. W. Graham, in the chair.

EXTENSIVE CARCINOMA OF THE FACE

Dr. Nicholas Senn: I will occupy only a few minutes of the time of the Society in presenting two cases illustrating very extensive carcinoma of the face. Both men are not far advanced in years — about the same age, 35 to 45 years — and are the subjects of two pathologically distinct forms of epithelioma or carcinoma.

The first patient entered the Presbyterian Hospital December 14, 1904, with the following history: Patient was admitted to the hospital for a carcinoma of the face. The disease began fifteen years ago, the patient says, from a scratch of the skin at the side of the nose, and continued to spread. About three years ago he was operated on by myself for the first time. At that time the disease involved the orbit, the superior maxilla on the right side of the nose, rendering evisceration of the orbit necessary, as well as resection of the upper maxilla, the nasal bone, and malar bone, creating an extensive defect, which was closed by taking a scalp-flap from the right side of the head, the size of which is now indicated by the bald area which marks the site of Thiersch's skin-grafting, which covered the enormous defect. The flap was brought into position in the same manner as at the last operation, which was done about two months ago. The wound healed by primary intention. The patient left the hospital, and remained in good health for about two years, after which recurrence took place, causing a large defect in the center of the flap. The disease of the flap extended underneath and invaded the frontal sinuses, encroaching also closely upon the pharynx. The second operation was performed two weeks ago, in a similar manner to the first one. I then removed what remained of the superior maxilla, took away a considerable part of the base of the skull, chiseled away the orbital margin, and, as the depth of this defect will show, extended the operation to the nasopharynx, closed the large defect again by a similar flap taken from the opposite side of the skull. The flap was left with a broad pedicle to insure ample blood-supply, and fitted and sutured into the defect. The width of the base of the flap is well shown at the point of turning it. I covered the large skull defect with Thiersch's skin-grafts. The skin-grafting has proved entirely successful, only a few small granulating surfaces being left. The large wound healed by primary intention, with the exception of a small defect at the lower margin, where I had to sever the margin of the lip completely. Here is a little marginal necrosis which will require vivifying of the margins of the defect and closure by suturing, which will be done to-morrow. I took great pains in dressing the wound to bring the flap in close apposition with the underlying irregular wound surface, and we have the satisfaction of knowing that this flap throughout has become united to the surface of the wound. The cosmetic result of the operation is satisfactory, when we consider the frightful appearance of the patient before the operation. There was a central large defect in the flap, and underneath the disease was progressing in all directions. The secretions from the cancerous mass in certain parts, particularly the frontal sinus, gave rise to putrefaction and a disagreeable odor. All these symptoms have disappeared.

The case illustrates a form of carcinoma which is not sufficiently understood. We had to deal with no tumor formation in this case. English authorities would call it a case of rodent ulcer, which, scientifically, means nothing more nor less than epithelioma without marked tumor formation, the carcinomatous process consisting of invasion of the tissues and ulceration, rather than any tumor formation. There was not, either at the first or second operation, anything like a well-formed carcinomatous tumor. The whole ulcerating surface represented what English authors have continued to describe as rodent ulcer.

Under the microscope we see the typical appearance of epithelioma. This case, in that respect, is a notable contrast to the second one, which I wish to show you.

CARCINOMA OF THE FACE

This patient has been married fourteen years, and is the father of four children, all of whom are

living and well, the oldest twenty-three, the youngest seventeen. His wife is living and well. His father and mother are both dead. His mother died of consumption. The cause of the father's death is unknown. As to previous sicknesses of the patient, he had measles and whooping-cough when a child. He had la grippe three years ago, when he was sick for three weeks. He is a farmer by occupation. He uses tobacco moderately. His appetite is good. He sleeps well.

Patient was admitted to the Presbyterian Hospital with cancer involving the greater part of the left side of the face, for which he sought relief. The disease began in the spring of 1886 as a small black pimple on the bridge of the nose. It grew slowly for twelve years. The patient did not trouble himself about it. Then, he said, he was poisoned while working in the woods, and the ulcer began to be suppurate. He consulted a doctor, who immediately burnt it with caustic. He burnt it on three occasions, and as a result it became worse. The doctor then abandoned this treatment and advised operation, but the patient did not have an operation done. Patient afterwards consulted a cancer doctor, who applied paste. He doctored with him for eight months, and said he was temporarily relieved, but the cancer returned after each treatment. Patient waited a year, then took X-ray treatment, and the sore healed over entirely. After this he came to Chicago to have the lower lid, which had been destroyed, restored. This was in 1904. The wound never healed after the operation. The tumor continued to grow, the patient doing nothing to check it. Later, however, he said he spent five months in St. Louis, undergoing radium treatment, from which he received no benefit. He continued to grow worse, and then entered the Presbyterian Hospital here. The patient said he had suffered very little pain until about three years ago. For twelve years he suffered little or no pain. The pain was not constant; it would come and go at intervals. The tumor became so large last spring that the patient lost his eye. There was not much discharge from the wound. The patient otherwise has been in good health and well nourished.

Operation was performed two weeks ago. The eye could not be seen, owing to the existence of a large tumor involving largely the malar eminence and the left side of the nose. This tumor began to ulcerate, and it involved the orbit.

I found in neither of these cases any indications of glandular involvement, although both patients have suffered from carcinoma from twelve to fifteen years. There is no indication now of any glandular involvement, and this encouraged me to perform these desperate operations, followed by extensive plastic procedures.

I removed in the second patient the orbital margin, cleared out the entire orbit, resected the superior maxilla, and a part of the nose being already destroyed, the remaining part or base of the nose was included in the excision. The alveolar process remains. The malar bone and the zygomatic arch have been removed.

This operation (referring to the second case) was performed in the same manner as that described in connection with the first case, by taking a large scalp-flap from the left side from crown of the head and temporal region. The wound healed very rapidly. I utilized this flap (indicating) in part with which to restore the lost part of the nose; that is, I made a partial rhinoplasty, with, as you perceive, excellent cosmetic result. The nasal passage of the left side is patent; the large flap has become adherent throughout, and the wound healed by primary intention, with the exception of a few small granulating points remaining, where the Thiersch skin-graftings have been applied.

I should like to have the members examine these cases.

In the first case the first operation was performed nearly three years ago, and was almost identical with the second operation. At the second operation the anterior wall of the frontal sinuses was very thin, on account of being encroached upon by the carcinoma, which found its way into the interior of the frontal sinuses. The new flap rests on the floor of the sinus, and has become attached along the entire surface of this large wound, that extends down into the pharynx. I was a little doubtful at the time whether I should be able to get the flap to unite in such an unusual locality, but, by applying well-graduated pressure over the flap, the wound in a remarkably short time healed throughout by primary intention. The flap has become attached to the surface to the depth of the wound. We will remove within a few days the little projection which you see where the large flap was turned.

In the second case there was the formation of a large tumor, while in the first there was no tumor formation whatever.

I would like to emphasize the damage that is done at times by the removal of such growths by the use of caustics. The second case furnishes a most excellent and instructive example of the incomplete removal of carcinoma by the use of caustics. This method of treatment adds fuel to the fire, invariably aggravating the disease, exag-

gerating its growth, promoting its extension, and as a method of treatment no thoughtful surgeon would resort to it at the present day.

Again, the X-ray produced only temporary beneficial results. I can say this conscientiously with regard to the use of the X-ray, that I have not seen a case of genuine carcinoma yield to X-ray treatment. Of course we cannot dispute the assertions made by prominent and reliable dermatologists in regard to the results obtained from the X-ray in treating superficial epithelioma of the lip and of other portions of the face. Such cases will occasionally heal under prolonged X-ray treatment; but the same results can be obtained in a short time by a limited operation. The cosmetic results are better, and certainly the chance of recurrence is much less than from prolonged treatment by the X-ray.

LIPOMATOSIS OF THE KIDNEY

DR. DANIEL N. EISENDRATH: The first case is one of exceptional interest in relation to the surgery of the kidney, and I thought it worth while to present it to the fellows of the Society on account of the fact that comparatively few cases of this kind are reported in the literature.

This man is 28 years of age, a conductor by occupation, and entered my service at the Cook County Hospital August 6th of the present year, with the following history: He stated that eleven years ago Dr. Donlon of this city operated on him for perinephric abscess, since which time the sinus has discharged continuously. Eight months before his entrance to the hospital he began to have tenderness of several joints, which bears no importance in relation to the present condition. At the time I first saw him he had a sinus, opening at about the center of the present nephrectomy incision. I injected methylene blue into it before operating, with the hope of following up the sinus, but on account of the rigid walls I was unable to follow it any distance. I made an incision at this point (indicating), and came down upon an immense amount of cicatricial tissue, so that I was puzzled at first to know where to find the kidney in the midst of the cicatricial tissue. I lost track of the sinus at one time, but found it again. It led to some hard bodies, which were evidently calculi. I proceeded to enucleate inside the cicatricial mass what I thought was the kidney. When I brought it up toward the surface, I found it was a mass of fat which had the shape of the kidney, and I found upon laying it out that it had exactly the shape of the kidney. On section of this mass, it showed the remnants of the original fœtal lobulation of the kidney — seven divisions by the fibrous septa radiating from the pelvis. The specimen shows in an excellent way the change of what is known as lipomatosis of the kidney or fatty transformation of the kidney as the result of chronic suppuration. The pedicle did not bleed, so that it was not necessary to ligate it. It seemed to have a slight blood-supply in places. Remnants of the pelvis of the kidney can be seen.

As I have previously remarked, there have been comparatively few cases of this kind reported in the literature. I was able to find in the *British Medical Journal* of 1883 an illustration which was a duplicate of the case which I had.

The origin of this fat is questionable, but it is pretty generally agreed that in the majority of cases its origin is from the perinephric tissue, and that this replaced kidney substance taking place destroyed the parenchyma.

RUPTURE OF THE KIDNEY

The second case is one of rather unusual form of traumatic rupture of the kidney. I expected to have the patient here for inspection, but he did not come. The patient was 32 years of age, and was admitted to the eclectic surgical service of the Cook County Hospital on the night of January 5, 1906, with the following history: He had slept in the police-station all night, having been intoxicated, and could give no history of injury at the time. Later, when he came to my service, I learned from him that he had fallen across a two-by-four board, striking across the kidney region. The patient was admitted to the eclectic service on account of a severe hæmaturia. The urine was not only markedly tinged with blood, but contained considerable blood for about two weeks. He was admitted on January 6th, and on January 9th another surgeon made an incision over the kidney and found that the kidney was torn from the cortex directly into the pelvis, and there was an extravasation of blood and urine in large quantities around the kidney. He came to my service in May, five months after the original nephrotomy, on account of a sinus, from which urine and pus were being discharged. I made an incision and reached a large cavity about the size of a child's head. I could find no traces of kidney tissue. I tried to dissect it out in different directions to see whether I could find any trace of kidney tissue, and in one or two places I got small pieces of kidney tissue. The rest of the kidney had been destroyed by suppuration following the accident or as the result of the original trouble.

This specimen shows that the kidney has been destroyed, with the exception of the pelvis and the ureter, which I removed at the time. Following

the original operation, the sinus did not close, and I opened it a second and third time, and then removed small fragments of kidney about the size of a walnut or a little smaller. After the second removal the sinus healed, and the patient made an uneventful recovery.

DISCUSSION

DR. MAXIMILIAN HERZOG: Dr. Eisendrath has asked me to say a few words on lipoma of the kidney, as such cases are rare. Dr. Harris and myself reported a case about eight years ago to the Chicago Pathological Society, and about two years after that Dr. Dahl reported a case which I examined microscopically, including Dr. Eisendrath's case. I have now examined microscopically three cases. The case of Dr. Harris still contained some remnants of the kidney; there were some atrophic glomeruli and atrophic tubules. The case led to considerable discussion at the time, and some of the members of the Pathological Society believed it was not a case of lipoma of the kidney, but one of hypernephroma. I reexamined the case subsequently, and since then I have examined a number of cases of hypernephroma of the kidney, and I know that there is absolutely no histological similarity between a lipoma and a hypernephroma of the kidney. The case of Dr. Eisendrath is a lipoma, and does not show any remnants of the kidney at all. Aside from the areolar (fatty) connective tissue, there are some traces of old hyaline connective tissue, but no remnants of kidney tissue.

These cases, as a rule, should really not be spoken of and classified as lipoma of the kidney, because this is not a correct pathological classification. They are not true lipomata, not true fatty tumors, but simply a hypertrophy of the perirenal fatty tissue. Ever since I examined the first case eight years ago, my attention has been directed to the fact that in cases of advanced interstitial atrophic nephritis, so-called granular atrophy of the kidney, it is not infrequent to find considerable hypertrophy of the perirenal fat, and I remember one case a number of years ago, where the perirenal fat was enormously developed, so that one might have spoken of that case as a lipoma. But all of these cases are simple hypertrophies of fat-tissue in consequence of atrophy of parenchymatous structures.

COMMINUTED FRACTURE OF THE PATELLA TREATED BY CATGUT SUTURE

DR. E. J. SENN: I desire to take only a few minutes of the Society's time in reporting a case of fracture of the patella.

S. W., aged 36, male, while at work on a building, fell to the ground, a distance of from twenty to thirty feet. Patient thinks that he struck on the right knee and then fell forward. Immediately following the accident, he entered the Presbyterian Hospital, June 12, 1906. On examination, the right knee was found to be swollen, and there were several areas of suggillation on the leg. Palpation revealed the patella broken into several fragments, the two largest of which were attached to the quadriceps extensor femoris and the ligamentum patellæ, respectively, and were separated for a distance of about two inches. Fluctuation was marked underneath the fracture. The patient could not extend the leg, and movement of the joint caused great pain. The limb was immobilized on a posterior splint and hot fomentations were applied. These were changed twice daily, in order to allay the acute symptoms. Five days later the patient was operated on. The field of operation was prepared two days in advance. A vertical incision was made in the middle line. There was a considerable escape of bloody serum and blood, and four fragments were presented to view. The lacerated tissue between the raw surfaces of the fragments was removed and fixation was effected by periosteal suture of iodized catgut. A transverse rent in the capsule on either side of the fractured patella was united with the same material. The external wound was closed in the usual manner. There was no drainage. The operation was done as much as possible with instruments and without manipulation, in order to minimize contact infection. The cast was removed in three weeks, and the wound found to have healed by primary intention. The fragments were in good position. The joint was massaged and slight passive movement made. A light cast was applied and the patient ordered to walk on crutches. The cast was allowed to remain two weeks, when active and passive motion was resorted to. The patient left the hospital July 23d. The functional result was good, and when seen a month later the power of flexion was almost normal.

I simply report this case in order to emphasize the point that radiographs often create a wrong impression. If you will study the first radiograph, taken before the operation, you will see that it is difficult to make out four different fragments. We were positive as regards the diagnosis of communication of the patella, but if we were to make a diagnosis by looking at the radiographs, we should not do so. The second radiograph shows that healing had taken place. This was taken about ten days after operation. It shows very good

approximation of the supposed two fragments, but in reality are four separate fragments. It shows that union is very good. I do not think there is absolute bony union, but periosteal union. Bony union is the exception in these cases.

Another point I wish to emphasize is, that union takes place quite readily, provided the wound is aseptic, and if there is perfect approximation of the fragments without much tension. We can secure this by bringing the fragments together, and holding them in apposition by means of an absorbable suture. I believe the time is past when silver wire or non-absorbable suture material should be used, except in very exceptional cases. In old fractures, where it is difficult to bring the fragments in apposition, a non-absorbable suture would be indicated. The use of absorbable suture material is the thing at the present time. Moreover, when we resort to suturing, it is far better to make a periosteal suture. There is no need of drilling the fragments, because in so doing there is much more liability later on of getting necrosis. There is also more risk in causing trauma to the tissues, and probably of infection also, in that way, with a consequent partial ankylosis. By simply using the periosteal suture we hold the fragments in apposition. When we think of the good results that are obtained by non-operative measures, simply bringing the fragments in apposition as well as can be done by means of adhesive strips, the functional result is not due to the fracture of the patella, but to its attachment, and a very important factor in performing this operation is to suture the rent in the capsule on either side of the patella, because when the capsule which contains quite a number of fibers that are given off from the extensor muscle is torn, there is interference with function.

Dr. E. Wyllys Andrews: Dr. Senn's point about the holding of the bone through approximation of the soft parts confirms exactly my own experience in numerous cases, six of which I have had in the past year. That method was first proposed in an article written by Blake of New York. Since the utility of the method has been so strongly brought out, I have been accustomed to teach and to consider in my own operative work the patella as, so to say, a sesamoid bone in the center of the tendon, and to devote all my energy to the closure of the fibers of that fibrous structure, and not to the bone itself, so that the old-fashioned term "wiring the patella" is a misnomer and obsolete, so far as my own practice goes. The patella union is only an incident in the ligamentous and tendinous repair by suture.

The lateral tear to which Dr. Senn has called our attention, extending transversely across the capsular ligament, generally goes about as far as the level of the condyles on each side. The method which I use is, first of all, to get the right support, to pass one suture through the upper portion of the lateral ligament, close to the bone, and one on the corresponding side. For these two heavy sutures I prefer kangaroo tendon or very durable catgut. When they are drawn together, the fragments of the patella will be in accurate approximation; the bony surfaces are attached to each other fully as well as if they were wired, and we do not have to use a drill. The fringes of the periosteum and longitudinal fibers extending toward the ligametum patellæ across to the front of the patella fold very much like a curtain between the broken ends, and it is obvious, if you push the fragments together as we do with the non-operative treatment, they must interpose between the fragments, explaining why we get fibrous union. The use one can make of these fringes is very great. The mass of fibers in front of the patella I use by overlapping, imbricating one within the other, shingling, so to say. This front layer has great value in the union. It includes the periosteum. Then the operation consists of a heavy suture placed on each side of the bone, and two or more down towards the condyle in the lateral capsular rents. I have also uniformly done this in addition to what Blake has recommended in the way of lateral sutures. I go around the patella with a large-sized kangaroo-tendon suture through the tendon and ligament above and below, and encircling the whole bone. This I always make of a thick strand of kangaroo tendon. It is quite easy to add this circular stitch to the other. I insert it early in the operation, and tie it after all the other sutures are in place.

Dr. Daniel N. Eisendrath: I wish to indorse the method described by Dr. Senn, as I have used it within the last two months in a case quite similar to his. A man was admitted to the Cook County Hospital with a stellate fracture of the patella. There were seven fragments altogether — four in the lower half and three in the upper half of the patella — and it was possible by periosteal aponeurotic suture to bring the fragments into apposition, so that the man was able to leave the hospital at the end of three weeks, and at the end of five weeks he was stepping on his foot.

There is one point which Dr. Andrews referred to, but which I think is worthy of special mention, and that is, the best way to relieve tension and to prevent the sutures in the periosteum from cutting out is to put them in in mattress fashion, in such a way as we very frequently see them in hernia operations, as by so doing there is much less danger

of their cutting in the direction of the aponeurotic fiber.

DR. L. L. MCARTHUR: I want to add an interesting observation I have made in the past year: that of a case of fracture of both patellæ simultaneously. One, however, had been fractured some years before, was treated by massage and splint without operative interference, with the result that an elongated ligamentous union had been produced between the fragments, leaving a joint which necessitated the wearing of a brace at all times.

The smaller fragment was attached to the lower tendon, and the elongated ligamentous union attached to the larger portion of the patella. After the lapse of years, it had become impossible to bring the two bony fragments in apposition. I therefore made an excision of the lower bony fragment, when it was quite possible to suture the tendinous end to the patellar tendon insertion. I secured good fibrous union, and the man now has on that side a very useful joint, with a partial patella. On the opposite side, silver wire was used, bony union secured, and the man can walk without crutch or cane.

I think too much emphasis cannot be placed upon the advisability of either trimming away these fringes to which Dr. Andrews has called attention, or, what is better still, whipping them up in one way or another with the catgut suture. I believe it is quite desirable to avoid the introduction of foreign bodies on all occasions if we can; but I am quite sure that with a clean surgical technique one can employ silver wire. Failure has come from a little knob of the silver wire left standing up in the tissues, sufficient to cause friction, or tearing as the skin glides over it. The wire should be so introduced that it will cause no friction.

DR. D. W. GRAHAM: My experience is like that of Dr. McArthur, that if the ends are buried so that there is no tearing by the projecting end, we are not likely to get trouble from the wire, unless we use wire that is too large or too much of it.

DR. JOHN C. HOLLISTER read a paper entitled THE NECESSITY OF COMBINING WITH GENERAL SURGICAL TREATMENT OF INFECTION, VACCINE THERAPY AND PASSIVE HYPERÆMIA. (See paper, *ante*, p. 740.)

DISCUSSION

DR. L. L. MCARTHUR: I want to express the satisfaction I have had in being associated with Dr. Hollister in this work, and in having as an associate so energetic, enthusiastic, and earnest a worker. It has been my good fortune to assist him in carrying out this work, to fit up a laboratory, and to supply the majority of the patients. This work, unfortunately, will be such that we shall not be able to do it ourselves. It is work that is time-consuming, therefore it will have to be done in some laboratory. I want to say that we have been fortunate in securing Drs. Lincoln and Vail to act for us in the laboratory, they having been former assistants of Dr. Hektoen, are enthusiastic and energetic in the work, and yet are very conscientious.

What I have learned in regard to this subject has been largely through Dr. Hektoen, from the reading of Wright's papers, and, in the past months, from the work in the laboratory. I think I may with propriety emphasize some of the points Dr. Hollister has touched on.

First, with reference to the washed leucocytes. It has been the impression over since Metchnikoff made his investigations that it is the leucocyte that is the great protector of the system. It is such, in a way, but only in the presence of the opsonins, for you can take the leucocytes and wash them, so that there are no more opsonins on or in them. If you then put them in the bacterial emulsion, the leucocyte cannot swallow them. The opsonin has been particularly well named, because it does prepare (bacteria) food for digestion. The opsonin in the blood prepares the bacteria, so that it can be taken up by the phagocyte without damage to the phagocyte. Remarkable, too, is the minuteness of the dose that is given. For instance, the one-thousandth of a milligram is sufficient so to increase these opsonins. The one-thousandth of a milligram diluted by the serum of a patient's entire blood is sufficient. This influences the leucocytes and their capacity for taking up bacteria, so that while the index before injection is only a fraction of the normal — three tenths, four tenths, seven tenths, or two tenths of one per cent — it rises to par or above. This dose is very minute as compared with the ordinary solution we have been using for diagnostic purposes in cases of tuberculosis, and it is not surprising that we get no constitutional reaction from so minute a dose; whereas with the old-time dose we do get headache, rise in temperature, and the subsequent malaise that go with it. Moreover, the opsonic index offers now a diagnostic means for tuberculosis without the dangers attendant upon the injection of tuberculin itself. If you constantly find for two or three days a tuberculo-opsonic index of five tenths of the normal, you can say that the individual is suffering with tuberculosis, for these indices are particular for each vaccine. The staphylococcus vaccine will not show a tubercular index, nor will a tubercular vaccine show a staphylococcus index.

Let us take the case of Mrs. S., who has for eleven years been suffering with varied tubercular manifestations, during which, for intervals of six months or a year and a half, she has been perfectly comfortable. She has at times a mixed infection, but is now suffering with infection from the ordinary pus organisms, having tuberculosis of the bladder and bladder-wall. She reacts to tuberculin injections, with pronounced rise in opsonic index.

The patients we have had for use have been those whom I have been treating for some months. In the case of Mrs. S., we have been working on her for eleven years, off and on. We have increased her weight from 87 to 180 pounds. Occasionally she has a period of depression.

The case of fistulous sinus referred to by Dr. Hollister is our prize case. The patient was a doctor's wife, whose tubercular kidney was removed two years ago. She was brought to me in the early days of September last, for extirpation of the ureter, a persistent fistula having remained. She did not want to go around wearing a dressing for a discharging sinus. With a few injections the sinus healed without local treatment, and she has been spared operative interference.

One might speak of a number of other cases, but they all express a feeling of well-being and improvement when their opsonic index is made to increase.

While we have worked along tubercular lines, this work can be extended with advantage to other infections which we are desirous of treating. For instance, a number of cases of gonorrhœal joints, which are usually bugbears to the surgeon, and have failed to yield to the customary treatment, have been made to clear up by using gonococcus sterile injections. A case of septic endocarditis has been cured. Multiple furunculosis has been made to clear up by injections of the staphylococcus. We have an incredible field opening up before us in the way of proper vaccination treatment of these cases.

Dr. Arthur Dean Bevan: Surgeons, as a rule, are skeptical. I can remember, fourteen years ago, when I was in Leipzig, that there was a great deal of work done about that time in connection with serum-therapy, and I was particularly enthusiastic over the results, especially the possibilities. From our present standpoint, the antitoxin for diphtheria has been the only form of serum-therapy that has been generally credited as being of value. Most of us who have used antitetanin have been disappointed. Of course, when it comes to the use of tuberculin, it has been so thoroughly discarded for a number of years as a therapeutic agent, that it is natural for us to be skeptical when Wright and others have reintroduced this in minute doses and have devised a method of determining the opsonic index. I am sure we all hope that this will be a great success. Personally, I must confess that I am skeptical. I should like to ask Dr. Hollister one or two questions.

First. If the thousandth of a milligram is employed in a case of tuberculosis, let us say about once a week, as has been done in these cases reported, without an elaborate technique, determining the opsonic index simply by the general control from the clinical evidence, can we not hope to obtain about as good results by administering larger doses? Why limit the dose to the thousandth of a milligram? What has determined Wright in his work so to limit this dose? That was not brought out clearly in the paper. Why can we not double the dose, or possibly treble the dose, with improvement?

Dr. E. Wyllys Andrews: From being skeptical, some of us have passed through a period of conversion to the Bier treatment, and have become believers in its efficacy. I remember my orthopædic friends told me early and often there was nothing of value in it. Perhaps all of us, far away from the German sources, were more or less skeptical about passive hyperæmia. However, since last year, having read the reports of the German Surgical Congress, and having had more and more experience with it, I have come to take exactly the opposite view. Personally, I have been forced to believe from what I have seen in my own practice that the Bier treatment has enormous possibilities. I have seen results from it that I never obtained in any other way in treating tubercular joints. I am prepared to believe that this treatment may be equally valuable in pelvic and visceral diseases. Dr. Hollister referred to the Bier treatment as a part of the opsonic methods he has outlined, and I can see how passive or active congestion, or something between active and passive congestion, must act not only in causing a rich outpouring of serum and of leucocytes, but also in causing rapid flux and reflux of the serum, carrying on some of this opsonic treatment by increasing the quantity of opsonic-bearing fluid locally in contact with the diseased area. It would be impossible to praise too much the work that has been brought out here tonight. I am proud to know that the Chicago Surgical Society is among the first in America to hear of this work. I know that some other of our laboratories have been doing this work since last summer. I would not overlook the valuable reports of Dr. Hektoen's work on opsonins published last winter. When one or two of our fellows will

do as Drs. McArthur and Hollister have done — make special journeys to Europe and equip expensive laboratories here at their private expense for such investigations — it almost seems as if the Society owed it to themselves to accord the work some public recognition and assistance.

DR. D. A. K. STEELE: All the indices we have seen so far have been from surgical tuberculosis. Dr. McArthur alluded to the absolute certainty of diagnosis by the opsonic index. I should like to ask Dr. Hollister whether he has had under observation any cases of pulmonary tuberculosis from a diagnostic standpoint with reference to this index.

Another point that occurred to me was, whether there was any method, other than this, of raising the index, showing improved resistance on the part of the patient, or greater resistance to bacterial infection, and whether blood counts or sputum examinations were made showing a diminution in the number of bacteria present.

DR. HOLLISTER (closing the discussion): One of the most interesting things in Wright's laboratory is to see a case of multiple furunculosis clear up under treatment by staphylococcus injections. He is glad to receive such cases. It is very satisfactory treatment, in that it is immediate and thorough. He can prevent recurrences of multiple boil by giving minute doses of antistreptococcic vaccine.

Another interesting thing is to see cases of lupus clear up and either get well or improve immensely.

In answer to Dr. Bevan's questions relative to the dose, I will say that if you want to give the right dose at the right time, you must employ the technique I have described, or one that is equally as good. Wright has found that if you do not give the right dose at the right time, the patient can get a low index; a lot of harm can be done before it manifests itself clinically, and when it does show clinically, it is difficult to raise the patient's index.

DR. BEVAN: Are all of these doses one thousandth of a milligram?

DR. HOLLISTER: We have used the one thousandth of a milligram in these cases, feeling our way along. The reason we have not given other or larger doses is because the charts show us, with one or two exceptions, that the patients have been getting better steadily. Here is one (referring to chart) case where we gave the eight-hundredth of a milligram, or not more than the six-hundredth, simply because Wright has found that he can add to the positive phase gradually, constantly, and keep on by regulating a small dose at frequent intervals, rather than big doses at longer intervals.

DR. GREENSFELDER: At what time and for what indication do you give your injection?

DR. HOLLISTER: We do not give an injection until two or three days have elapsed; if the index does not go up in three or four days, we give another injection. If it does not go up constantly under that dose, we try a larger one.

With reference to the remarks of Dr. Steele concerning pulmonary tuberculosis, Wright has done considerable work with it, and his results are not by any means discouraging. I cannot state, however, his position with reference to pulmonary tuberculosis, except to remark that I do not believe he has worked at it sufficiently long to warrant definite reports. Our own experience with pulmonary tuberculosis has been comparatively *nil*. We have two cases now, also one of lupus and another case of hip disease.

It was only through the help of Dr. McArthur that I have been able to prepare this paper, because he has furnished us a laboratory, all of the patients, and has backed us up generally.

This is not a serum-therapy; it is a vaccine-therapy. It is a therapy where we use an emulsion of organisms which Wright has termed vaccine.

I understand that there is going to be a symposium later in the year before this Society on Bier's treatment, consequently I shall take up only one point in connection with it. The reason why Bier's treatment helps us is this: If we have a localized, chronic, indurated, tubercular, or other affection, that indurated area is weak not only in fluids, but weak in the flushing of fluids that contain opsonins. If we increase the amount of fluids, flushing out back and forth, by means of passive hyperæmia, we get to a place where the organism has more serum than lymph, and in this serum we have built up by this method more opsonin to the specific infection. I do not think that has yet been brought out definitely — the relationship between Bier's treatment and this treatment, and the assistance we can get in working the two in our surgery.

Wright encountered much opposition amongst surgeons at St. Mary's Hospital, where he works in the laboratory, but he defeated it all by this one case. A young patient (I do not know whether it was a boy or girl) had ascites. A clinical diagnosis of tubercular peritonitis, with nodules in the mesenteric gland and throughout the mesentery, was made. The patient was not only tapped, but underwent an exploratory operation, and two well-known surgeons, with their assistants, pronounced the case one of tubercular peritonitis. The ascites returned, and, at last, in desperation, they turned the patient over to Wright, who was asked to do

what he could. He examined the blood of the patient and found it normal. He examined it a second time and found it normal. The next time it was found normal by an assistant, and he sent up word that the patient had not tuberculosis. They laughed at him. Shortly afterward the patient died, and the autopsy disclosed a miliary sarcoma. It was on this basis that we have tried to bring out the diagnostic value of this work to-night.

I hope to be able to bring these charts to the Society later in the year, and show them to you, when the clinical findings are more marked, to see how these cases are. In one of these cases two of the best surgeons in town saw the patient. One made a diagnosis of metatarsalgia, while the other hesitated and said the patient might be malingering. We took some skiagrams which do not seem to show a normal condition. We operated, cutting into the bones of the foot, and the sections we have made I am not yet able to report on, but I am hoping, not for the patient's sake, but from our standpoint of diagnosis, that we may find some giant cells in these slides, and I feel that we shall, from the hasty preliminary review I have made of the slides. She had a persistently normal low index and has persistently gone up with the injections.

Dr. Carl Wagner: Is it the microbe which is changed, or is it, to a great extent, the surroundings in which the microbe lives?

Dr. Hollister: The organism is so affected by the opsonins that it becomes subject to phagocytosis. The opsonins are chemicophysiological bodies, and they in some way satisfy the affinities of the organism, so that the organism's resistance to phagocytosis is diminished. That is as I understand it. That may be carrying out Ehrlich's side-chain theory, and the matter may be explained later on that basis.

PAROVARIAN CYST COMPLICATED BY INTESTINAL OBSTRUCTION AND GALL-STONES

Dr. E. P. Cook of Mendota, Illinois: The specimens which I wish to show you were taken from a woman ninety years of age, upon whom I recently did an ovariotomy under infiltration anæsthesia, removing a parovarian cyst which contained a gallon of fluid. The case is interesting on account of the age of the patient, and especially on account of the association of other lesions. I will not take time to go into the question of diagnosis or the reasons for surgical interference. Suffice it to say, I had a case of ovarian cyst complicated by an intestinal obstruction in the region of the upper rectum, and an ovariotomy was done to give the patient a chance for her life. The cyst was on the left side, and free from adhesions. I could have completed the operation under local anæsthesia, but when I found the cyst was parovarian, a few whiffs of chloroform were given to facilitate its removal from the broad ligament. The patient had no shock, and when she left the table she was conscious and in as good condition as when we began the operation. Death followed forty-eight hours after operation. At the autopsy there was evidence of primary healing of the abdominal and pelvic wounds. It was difficult to determine at the time of operation the cause of the intestinal obstruction. I found a large mass in the pelvis, and did nothing further, closing the abdominal wound. This large mass was composed of several loops of small intestines, which were adherent to the upper portion of the rectum. The patient had suffered many years from chronic constipation. The loops of intestine were firmly adherent, and there was a hard mass at the point of adhesion, due, as far as I can make out, possibly to a very old tubercular lesion. There was nothing abnormal elsewhere in the abdomen. The loops of intestine showed beginning gangrene from pressure, and evidences of slight peritonitis. I have here the right tube and ovary, which show very satisfactorily the condition of these organs at ninety years of age, and also a small cyst of the broad ligament on the right side.

What I think is most particularly interesting to the surgeon was the condition of affairs in the region of the gall-bladder, although this had no direct bearing upon the surgical condition for which operation was done. The liver in the region of the gall-bladder showed evidences of an old inflammatory process; I found the gall-bladder contracted and containing gall-stones; the common duct was greatly dilated, and contained half a dozen gall-stones. There seems to be a direct connection between the gall-bladder and common duct, but I have been unable to determine any distinct cystic duct. The point of special interest is that the common duct is very greatly dilated, containing a number of gall-stones, and there is an entire absence of any history of trouble in the gall-duct region for a period of nearly fifty years. I believe it is a mooted question as to how long gall-stones can remain in the common duct without causing clinical symptoms.

TRANSACTIONS OF THE CHICAGO GYNECOLOGICAL SOCIETY

RUDOLPH WIESER HOLMES, M. D., EDITOR OF THE SOCIETY

Stated meeting, September 21, 1906.

The President, DR. FRANK T. ANDREWS, in the chair.

DR. RUDOLPH W. HOLMES read a paper on THE BLOODY METHODS OF RAPID DILATATION OF THE CERVIX UTERI AT FULL TERM. (See paper, *ante*, p. 777.)

DR. HENRY F. LEWIS read a paper on THE BLOODLESS METHODS OF RAPID DILATATION OF THE CERVIX UTERI AT FULL TERM. (See paper, *ante*, p. 756.)

DISCUSSION

DR. CHARLES S. BACON: The essayists seem to assume, and we may agree with them, that methods of dilatation are necessary and desirable. In cases of cicatricial contraction of the cervix, dilatation is absolutely necessary, unless a Cæsarean section is done; but in other cases, where the indication is one for hastening the labor, operative dilatation should be employed with moderation. I believe it is a great mistake to dilate as fully as is advised by Newell in a recent article. All of the methods mentioned are of value, with, perhaps, the exception of the Bossi method. Although I have had no personal experience with this method, judging from reports that have been made, and the nature of the method itself, I believe that the conclusion of Dr. Lewis is justified.

In regard to this method, I should like to call attention to one point that does not seem to have been settled, in spite of all that has been written on the subject, and that is the question of the number of arms needed and the way of protecting them. It has not been cleared up as to whether the injury is produced at the point where the blades come in contact with the tissues or between them. It would seem, judging from reports of cases, that the injury is produced by the blade itself, the tissue being bruised at that point. When there is a considerable laceration, it is made by the blade, and not by the stretching of the tissues between the blades. So there is not so much advantage in multiplying the number of blades as in changing their character. It is a somewhat complicated problem, but still a legitimate one. One thing is certain, that if the injury is done by the blade, then the blade should be protected sufficiently, so that the injury cannot be done. Of course, that is the object of putting on these caps, which broaden the points, but most of the caps are roughened, which interferes with the slipping of the tissues over the blade, and increases the possibility of injuring the tissue. The smoother the surface, the better. Therefore I think that Dr. Higgins's dilator is better than the others. I doubt whether the bracelet ring arrangement of Knapp has any special advantage. However, the possibility of success by manual dilatation is so great that we may rely on it. The other methods of dilatation are of value, although danger attends the use of every one of them. The manual methods should be preferred in cases where they can be expected to succeed; not otherwise. Everybody has seen cases where it is practically impossible to dilate manually, and in these cases other methods must be employed.

As to cancer, while the necessity for a bloody opening in the cervix is present in many cases, a question that is most important is, What is to be done after the cervix is opened and the child expelled? The question of removing the uterus, either by the vaginal or abdominal operation, must be considered in this connection, because in nearly every one of these cases the outlook is a hopeless one, and I have not been able to see the reason for even a vaginal removal of the uterus. It complicates the case, and increases the danger to the mother.

As to placenta prævia, I am satisfied to rely exclusively on the method of turning and tamponing with the presenting part of the child, saving the life of the mother at least. I never hesitate in the least to let the child die in the uterus after turning, if I feel that to do otherwise would subject the mother to additional risks. If the labor goes on for hours, the mother has a better chance to recover from the loss of blood. In case we have plenty of assistance and favorable surroundings, and we find after turning and control of the hemorrhage that the child is in imminent danger, then we may try to save it, and the question comes up whether we shall dilate the uterus by some bloodless method, or whether we shall cut. Here I prefer to make the incisions rather than to dilate.

As to the indications in eclampsia, it is easy enough to prove by statistics that any method of treating eclampsia is the best or the worst. I have had cases where operation failed to accomplish anything, yet we cannot afford to be as pessimistic about vaginal Cæsarean section in eclampsia as Dr. Holmes is. I believe that that

is the operation in cases where manual dilatation cannot be effected, and where rapid delivery is indicated.

DR. CHARLES B. REED: I think that the expressions we have heard this evening are the expressions of the sane, rational, and conservative obstetricians of the day. The essayists have embodied in their papers a thorough *résumé* of our knowledge and experience, and the majority of obstetricians will agree with them, unless they happen to be wedded to some particular method. As Dr. Bacon stated, every one of these methods has its place, and this place must be determined by the obstetrician. I should like to emphasize one point that has not been brought out sufficiently heretofore, and one that is applicable to every method of treating placenta prævia. I refer to the axiom which was first formulated by Dr. Jaggard. He said that a patient with placenta prævia should never be left by the obstetrician under any circumstances until she has been delivered. That *dictum* applies particularly to the bag, because the bag is an instrument which requires usually a great deal of time in its application and in its proper manipulation. If the bag is working satisfactorily, the temptation to leave the patient for a while is great. As a result of this, I have known of a number of cases in which the bag was expelled suddenly and a severe hemorrhage resulted, which in several instances proved fatal.

I agree with Dr. Lewis that the fingers are the instruments of election: 1. Because they are intelligent; 2. Because they are accessible; and 3. Because they are effective. I would use the bag as a secondary means when the fingers, for some reason, are contraindicated.

DR. H. EDWARD SAUER: I should like to have Dr. Holmes state whether I understood him to say that carcinoma of the cervix always is an indication for doing a vaginal Cæsarean section for delivery of the child. I had the privilege of watching Dr. Chrobak confine a case where the whole cervix was carcinomatous, but where only a portion of the carcinoma had appeared on the vaginal side of the cervix, involving about one half. His two assistants insisted that it was impossible to deliver the woman normally, but Dr. Chrobak persisted in his efforts, and effected delivery in eighteen hours, without untoward results.

I would also have Dr. Holmes state just how far he thinks a vaginal Cæsarean section for myoma is of use. I had the privilege of assisting Dr. Brünning in von Winckel's clinic, in a case of myoma of the uterus, where there was a frightful hemorrhage, where he took a long time to get the myoma out. After delivery was effected, the woman was put to bed. She died in an hour. If he had done an abnormal Cæsarean section, I am sure the woman would have had far better chances to live.

I should like to ask Dr. Lewis why he neglected to make a reference to Dr. J. C. Webster's modification of the Barnes bag. In order to prevent rupture of the bag, Dr. Webster covers it with a widely woven network of linen threads, like that on the bag of a Paquelin cautery. There can be no rupture, and on account of the roughness of the surface of the bag, it is retained much better in the cervix.

DR. HOLMES (closing the discussion): If I had had time to read all of my paper, certain points would have come out more clearly. First, in regard to indications. I hold there are two broad indications for obstetric dilatation; one, the essential indications, those due to the various forms of cervical rigidity; the other, the contributory indications, those due to complications of labor. In the presence of essential indications, I believe one of the two methods of incisions is often indicated. Which one to be employed is dependent upon the presence or absence of effacement. On the other hand, complications of labor, as eclampsia, heart disease, etc., *per se*, are not necessarily indications for vaginal Cæsarean section. If there be a combination of essential and contributory indications, then, I believe, the way is clear. My contention is, that eclampsia unaccompanied by a rigidity is rarely an indication for vaginal Cæsarean section. My experience with eclampsia is relatively small, when compared with that of the large European clinics, but I think it compares well with the numbers of those falling to the lot of Chicago obstetricians. I have never seen a case that did not have some dilatation at the time I arrived on the field of action, neither have I seen one which could not be delivered easily by manual dilatation. Some physicians believe cervical rigidity is very common, but it will be found that most of the cases are due to other causes; most are due to too hasty attempts at dilatation. With some experience in obstetrics, I can recall only about six real instances of cervical rigidity, although I have seen numbers which were thought to be rigid. Unquestionably, eclampsia complicated by cervical rigidity, or an intact cervix, may be most expeditiously and conveniently delivered by vaginal Cæsarean section. I believe I have shown in my paper that results are no better in vaginal Cæsarean section in eclampsia than they have been in manual dilatation. The method of delivery has less influence than the fact that delivery has been consummated.

I thoroughly agree with Dr. Bacon that version

followed by slow extraction is the approved method of delivery in placenta prævia. Results will continue to be better by means of slow extraction, or better by spontaneous expulsion, than by means of incisions. If I were to concede on type of case for vaginal Cæsarean section in placenta prævia, it would be when the placenta is on the posterior wall.

The cancer question is a momentous one. We all have vague notions of operable and inoperable cases of cancer. There may be a small nodule on the cervix, and yet the case be essentially inoperable, at least by the vagina, as metastases have already occurred. Another woman may have a more advanced carcinoma, and yet be an operable case, because metastases are absent. As a mere speculation, I would hazard the statement that if the carcinoma is localized as far as one may determine clinically, then an early vaginal Cæsarean section followed by hysterectomy would be in order. If the disease is more advanced, the more rational thing appears to be to keep the woman quiet, permit her to go to full term, watching developments, and if necessary do an abdominal Cæsarean section, which is preferable at full term with a cervix badly diseased, for the child should be the first consideration.

As to myoma, no one can tell how many tumors are contained in the uterus. Probably the abdominal route will be more employed than the vaginal. Cases must be particularly favorable for a vaginal attack.

Dr. Lewis (closing the discussion): All the metal instruments used for dilating the cervix bruise the tissue, and if used long enough, they produce necrosis. This does not occur when we use the fingers, because they are soft and padded. Cases are on record where the blades of a metal dilator have torn right into the tissue. That can never occur when the fingers are used.

I should like to have Dr. Sauer give us the literary reference to Dr. Webster's instrument. He evidently does not use it very much or think much of it, because in the six years that I was with him I never heard him mention it nor saw him use it.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF SURGERY

UNDER THE CHARGE OF

JOHN B. MURPHY, M. D. — E. WYLLYS ANDREWS, M. D.
FREDERIC A. BESLEY, M. D. — WM. R. CUBBINS, M. D.

RENAL TUBERCULOSIS. By George Walker.

In this exhaustive article the author presents an analysis of 373 cases of renal tuberculosis and 84 cases of tuberculosis of the remaining genitourinary organs which he has collected from the literature, together with a study of 79 cases of genitourinary tuberculosis which have occurred in the wards of the Johns Hopkins Hospital and in his private practice.

The salient points are as follows.

Frequency of Kidney Tuberculosis. In the autopsy records collected from various sources the author finds that of all cases examined postmortem, the number showing kidney tuberculosis varies from three to six per cent. In cases dying of pulmonary or other forms of tuberculosis, from 17 to 25 per cent had tuberculosis of the kidney. In 1,369 autopsies at the Johns Hopkins Hospital there were 61 cases (4.4 per cent) of renal tuberculosis. In 482 cases which had manifested signs of pulmonary tuberculosis during life, 23 showed tuberculous lesions in one or both kidneys. In 266 cases where other tuberculous processes were found at autopsy, but in which there had been no manifestations during life, two renal lesions were noted. In 36 cases of miliary tuberculosis, one or both kidneys was affected in every instance.

Pathology. The author, in his examination of a large number of specimens, extending over a period of four years, and from his study of experimental lesions in rabbits' kidneys, arrives at the conclusion that tubercle bacilli may gain access to the kidney by three distinct routes: *First*, and most commonly, through the blood current; *second*, more rarely, by an extension into the kidney from surrounding organs, principally from tuberculous foci in the vertebræ; and *third*, only in exceptional instances, by an extension upward from the bladder. The opinion, held by some authors, that infection may take place through the lymphatic system, the author believes is unwarranted, inasmuch as no lymphatic vessels going into the kidney have been demonstrated. The most common ports of entry for the bacilli are the respiratory and alimentary tracts. That they may thus enter the system without producing lesions in the mucous membrane, the author has clearly demonstrated. In experiments on animals fed on an emulsion containing tubercle bacilli, and killed several hours later, the mucous membrane was found to be intact, but the neighboring lymphatic vessels showed tubercle bacilli, and soon, also, the organisms appeared in the bronchial lymph-glands. Once these bacilli have gained entrance to the blood, if arrested in their course, in organs where conditions are favorable, a localized tuberculosis is produced, and it is well established that this is the pathogenesis of most cases of renal tuberculosis.

Researches have proven conclusively that in the majority of instances the tubercle bacilli are stopped first in the glomerulus, and are propagated from this point. The bacilli may pass out through the glomerulus in three ways: 1. When fusion of the tuberculous area with the capsule occurs, a direct invasion is rendered possible; 2. They may pass into the small blood-vessels at the base of the glomerulus; 3. They may pass into the cavity of the capsule and down the tubules, where they lodge. As these early tuberculous processes, whether in the glomerulus or tubule, become disseminated throughout the kidney, the organ shows a slight, or occasionally a considerable, increase in size. The non-invaded kidney structure not infrequently shows a definite diffuse nephritis.

Injection through the Blood-current. Gross Appearances. Three forms of gross renal tuberculosis are to be distinguished: 1. Miliary tuberculosis; 2. Chronic tuberculosis with the ureter patent; 3. Chronic tuberculosis with the ureter blocked. The miliary form is in no way a surgical condition. In the chronic nodular form, where the ureter is patent, the kidney may or may not be enlarged. The process often advances, causing complete destruction of the kidney substance. The blocking of the ureter is brought about in two ways, either by a tuberculous process in the mucosa, or it may be plugged by a mass of tubercu-

lous *débris* or blood-clot. In this form there may be a massive degeneration and destruction of the whole kidney, or a hydronephrosis may result, and here the increase in the size of the organ is very marked.

Ascending Tuberculosis. Extension of a tuberculous process from the bladder to the kidney, the author asserts, is now considered by surgeons and pathologists a very rare occurrence. Experimental procedures also speak against the ascending form. That it may occur, however, has been proven in certain instances. It probably always results either from an infiltration of the lower end of the ureter so that it fails to become closed in the normal manner, or by a definite obstruction in the urethra, or at the vesical neck by the prostate.

Infection of the Kidney by Extension from the Surrounding Organs. Patoir, Monel, Hollingsworth, Tuffier, and numerous other writers, have reported cases in which the kidney was infected from an extensive tuberculous process in the vertebræ, the organ having become diseased by direct invasion. In this form there is first an erosion of the capsule, with later an implication of the kidney substance. No alteration in volume and no change in the urine are observed until the process reaches the pelyis of the kidney. Proving that the kidney capsule is very resistant to this sort of infection are the observations of the author, as well as those of Albaran, both of whom have noted instances in which the perirenal tissues have become tuberculous without a break in the capsule.

Condition of the Remaining Genitourinary Tract, the Renal Tuberculosis being Primary. In the cases herein reported and collected in which a statement was given in regard to the other genitalia, tuberculosis of the bladder was found in 42 cases; of the seminal vesicles, in 9; of the prostate, in 15; of the testicles and epididymis together, in 36; of the ureter, in 40. Posner states that in 149 cases he found the bladder involved in 18, and the testes in 8.

Condition of the Bladder. Contrary to what one might expect, the bladder does not become infected early; the mucous membrane offering a very decided resistance to the invasion of the tubercle bacilli. Nevertheless, the symptoms belonging to irritation of the bladder, pain, tenesmus, and frequent urination were present in over ninety per cent of the kidney cases. In practically all cases, on examination could be seen a red elevation of the mucous membrane around the ureteral orifice on the affected side, and extending from this area downward to the neck of the bladder, redness and congestion of the entire mucous membrane. In occasional instances the entire mucosa of the bladder was found injected, and of a dull, grayish red color, the normal luster being absent; this condition representing, not a diffuse tuberculosis of the bladder, but a cystitis, the result of irritation of the tuberculous excreta. The tuberculous involvement was usually in the form of definite ulcers, situated most frequently about the ureteral orifice of the affected side.

The Ureter. The consensus of opinion is, that primary tuberculosis of the ureter never occurs. In renal tuberculosis, the ureter was found to be involved in from ten to twelve per cent of the cases. It is most frequently implicated when the pelvis is diseased, or in patients who have a secondary tuberculosis of the bladder.

The Effects of Pulmonary and General Tuberculosis on the Kidney. The more recent writers on this subject, notably Coffin in 1890, Daunic in 1893, Pissavy in 1898, Landonzy, and Bernard, practically all, agree that a diffuse parenchymatous nephritis is the most frequent lesion found in the kidney in pulmonary or general tuberculosis, and they believe that is comprises about 40.60 per cent of all cases. The interstitial variety is uncommon, as is also an *amyloid degeneration*, at least according to the findings of the author.

Tubercle Bacilli. The bacilli appear in the urine very early in renal tuberculosis, and are always present with the pus and *débris*. The frequently reported failure to find the specific organism the author believes to be due to inaccurate observation, for his experience has taught him that a thorough search will lead to their discovery in nearly every instance. His method of procedure is given in detail. When he was unable thus to demonstrate their presence, guinea-pigs were inoculated. The inoculated animal should develop tuberculosis in from two to five weeks.

Smegma Bacilli. A source of grave error has been the frequent confusion of smegma bacilli with tubercle bacilli. The author, from other sources, has collected reports of a number of operations, which were performed for a tuberculosis of the kidney, the diagnosis having been made on the supposed presence of tubercle bacilli in the urine. At operation no tuberculosis was found. This error, the author has found, can usually be eliminated by obtaining with great care a catheterized specimen. When this is impossible, a reliable differential stain should be used, or, as suggested by Trudeau, in all cases a guinea-pig should be inoculated.

Ætiology. Primary tuberculosis is rare. The process in the majority of instances is secondary

to a tuberculous process in some of the other organs, the most common sites of infection being the bronchial and lumbar glands. As predisposing factors, the author mentions trauma, the presence of stone, and acute inflammatory infections. Gonorrhœa seems to bear no relation to the infection of the kidney with tuberculosis. No explanation can be offered as to why one kidney becomes involved and the other remains free.

Age. The ages of the collected cases ranged from 7 months to 63 years; the largest number in the decade from 20 to 30 years. Average age was 27.66 years. In Hunner's series the average age was 33½ years.

Sex. Out of 386 cases in which sex was stated, 182 of the patients were males and 204 females.

Kidney Affected. In 216 cases in which the diseased kidney was specified, the right was affected 111 times, and the left 96 times; both were implicated 9 times.

Condition of the Other Kidney. From a close study of the histories of the reported cases, the author is led to believe that where the disease is primary in one kidney, in the majority of cases over two years elapse before the other kidney will become involved. Autopsies have shown that in those cases where there has been more or less general infection, some form of nephritis is present in the non-tuberculous kidney in about 73 per cent of the cases. This is produced by the excretion of tuberculous toxins. A compensatory hypertrophy of the sound kidney is nearly always present.

Symptoms. These are classified as local and general. The local manifestations in the order of frequency are: Polyuria, with no abnormal constituents; the presence of abnormal constituents in the urine, pus, blood, and *débris*; disturbances of the bladder, frequent and painful micturition; pain in the region of the kidney, dull, continuous, or very sharp or paroxysmal; hæmaturia; the development of a tumor mass.

The constitutional symptoms are:

Fever. Slight or absent at first, later irregular, as in other tuberculous infections. After secondary invasion of kidney with other organisms, the evening temperature reaches often 105°.

Sweats. Often occurring daily, in early morning, or only two or three times a week.

Loss of Flesh. In the chronic form the loss of flesh is very gradual; in the more acute processes it is much more rapid.

Anæmia. Usually marked. Leucocytosis after invasion of other organisms.

Vomiting. Usually follows an acute paroxysm of pain, and is also present in the late stages, where there are profound digestive disturbances.

Uræmia. Only present, as a rule, when both kidneys become implicated.

Diagnosis. It is only in the earlier stages that diagnosis is difficult, and likewise of the greatest importance. Here there may be present only one one of the above enumerated local signs. Very frequently it is that of bladder irritation. This fact should be given emphasis.

The tuberculin test, while resorted to frequently, is, the author states, not entirely without danger, for it undoubtedly produces definite changes in the epithelial cells of the kidney. The probability of other foci in the body renders the test of doubtful value.

Method of Determining Which Kidney is Affected. While the subjective signs and palpation render material aid, the most conclusive evidence is obtained by means of the cystoscope. Also, when further proof is necessary, the ureters should be catheterized. This latter procedure, while objected to by a number of operators, mainly on the ground of possible infection, is, in the opinion of the author, a safe and justifiable one if carried out under proper precautions. The various other methods of obtaining from the bladder the individual urines is considered impracticable and not without danger.

The Functioning Capacity of the Other Kidney. Since autopsy records prove that the second kidney is diseased or inadequate in from 60 to 75 per cent of the cases, and that a single kidney is present in every 5,000 individuals, it is vitally important to determine the presence and working capacity of a supposedly sound kidney when a nephrectomy is contemplated. For determining that two kidneys are present, the cystoscope is the most reliable agent. It should be borne in mind, however, that a source of error is encountered in malpositions and double ureters. The functioning capacity should be determined, first, as regards the permeability, by the use of methylene blue, the secretory function by phloridzin,and the amount of work which the kidney is doing by cryoscopy.

Prognosis. In the experience of the author in the pathological laboratory of the Johns Hopkins Hospital, and in a careful search of the literature, he is unable to find a single authentic case in which renal tuberculosis has ever healed spontaneously. In a few instances, after complete destruction of the kidney, the disease has apparently become arrested. Such a favorable outcome, however, is rare. Death is caused, if the condition is not treated, in from a few months to several years. That the condition may exist in one kidney for from one half to two years without producing lesions in the other kidney has been proven.

Treatment. As systemic treatment has been proven to have little if any effect on the progress of the disease, removal of the kidney is the only means of cure. The author discusses in detail the various phases of nephrectomy, collecting the statistics of numerous other writers and giving their operative and ultimate results, and then presents the following table of his own collected cases: After 267 nephrectomies, 210 of the patients survived the operation, and were living at last accounts; 38 died within the first three weeks, and 19 at a later period. Of the 210, 79 were spoken of as well, 83 as recovered, 20 as cured, 4 as good results, 7 as improved, 2 as not improved, 15 as improved at first, but later showing unfavorable conditions. Of these 15, 3 are weak and ill, 5 have a persistent cystitis, 2 have involvement of the other kidney, 1 has tuberculosis of the lungs, 1 has general tuberculosis, 1 has pain in other kidney; of the other 3, no definite record is given.

Nephrotomy. It is of value only as a palliative procedure, or as a preliminary measure to nephrectomy in cases of large renal or perirenal abscess. The question *when to do a nephrectomy*, and its contraindications, is considered at length. In a general way it can be said that neither a slight pulmonary involvement nor tuberculosis of the remaining genitourinary tract, provided the other kidney is uninvolved, is a contraindication to nephrectomy.

Operative Technique. The mortality by the lumbar route is found to be less by 8 or 10 per cent than by the abdominal. An incision is favored which begins at the margin of the muscle about three quarters of an inch below the border of the rib, and is extended obliquely downward nearly parallel to the rib for a distance of four inches. Bearing in mind the possibility of forcing myriads of bacilli into the blood-vessels and lymphatics during the manipulative procedures attending the delivery of the kidney, and thus producing a general infection, the author suggests a new procedure, which consists in first ligating and cutting the vessels through an abdominal incision, then closing, and completing the removal by the lumbar route.

The ureter, if it presents evidences of tuberculosis, is removed as low down as possible, otherwise it need not be excised.

The complete histories and operative notes of 38 cases are appended. — *The Johns Hopkins Hospital Reports*, xii, 455. [GEORGE E. BEILBY.

CARCINOMA OF THE RECTUM. By J. Petermann.

Petermann analyzes all the cases of carcinoma of the rectum that have been treated in Professor Rotter's Berlin Clinic since 1893. All told, there were 155 cases, and on these 155 the radical operation was performed 110 times and the combined operation 25 times; but since these cases will be considered separately by Professor Rotter, Petermann considered only the remaining 85 cases. He deals with the subject under the separate heads of Diagnosis; Ætiology; Indications for Operating; Method of Operating; After-treatment; and Results.

In regard to ætiology and diagnosis, no new data are advanced. Petermann merely points out the frequency with which carcinomata develops from rectal mucous polypi, and emphasizes the fact that the early diagnosis of carcinoma of the rectum depends on how early medical aid is sought.

The indications for operation are much broader at Rotter's Clinic than those set by Witzel and many other European operators. Moderate involvement of the uterus, bladder, prostate, and seminal vesicles is not considered as a contraindication; neither is advanced age. Petermann concedes, however, that a patient over seventy must be treated with great care. During the last three years the dorsal method of operating has been used exclusively. This method gives a free exposure of the rectum, and has no disadvantages, except the tendency to coccygeal hernia formation. Whenever it is possible, the sphincter is saved, and this is possible if the growth does not extend farther than within three to four centimeters of the sphincteric border. The operative technique, in detail, is as follows: Morphine-scopolamine-ether anæsthesia. Patient lies on his right side, with the right thigh extended and the left thigh acutely flexed. The anus is closed by suture. An incision is made from the left posterior superior spine to the tip of the coccyx, through the skin, gluteus maximus, and sacrospinal ligament. The anterior and posterior surface of the coccyx are dissected free, and then the coccyx is resected. The presacral fascia is now divided at its lower part, and the operator separates the rectum from the prostate or vagina, by blunt dissection, as far up as the peritoneal fold. Two or three ligatures will be necessary to tie off the lateral attachments of the rectum. Then the presacral fascia is divided transversely at the level of the third or forth sacral vertebra. Just above this incision lies the sigmoid. The peritoneum, which is opened in the middle line, anteriorly, is divided all around its attachment to the rectum. The operator inserts his hand through the opening in the peritoneum, grasps the sigmoid, and, drawing it downward, places two ligatures about it. This much of the procedure requires about thirty minutes. After the intestine has been sufficiently mobilized, the

opening in the peritoneum is sutured and protected with gauze. If the rectum is to be amputated, the anus is circumscribed by an incision continuous with the one already made, the lower part of the rectum freed, and then the rectum amputated between two clamps placed above the tumor. If a resection is to be done, it is done between clamps placed above and below the tumor. After an amputation, a gluteal anus is made, in practically all cases, in order to guard against soiling the wound with the fæcal discharge. A gluteal anus usually obviates the marked prolapse, which so often follows when a sacral anus is made. If a resection is done, and if the upper end of the gut can be readily pulled down, it is pulled through the sphincter. In some instances a circular end-to-end suture was done, the suture line being covered with Rotter flaps. If the condition of the patient demands a speedy termination of the operation, both ends of the gut are anchored in the wound, and a secondary suture done later.

The after-treatment consists in constipating the patient for eight or ten days. The second day after the operation, the gauze tampons are loosened a bit, and by the end of the fourth day the whole dressing is changed. Catheterization may be necessary for eight or ten days.

Up to three years ago, the mortality was 32 per cent; but during the past three years the mortality has fallen to 4.75 per cent. The causes of death were sepsis, cachexia, collapse, and peritonitis. The functional result is necessarily bad after amputation. None of the numerous methods advised really secure complete continence. The functional result after resection was almost uniformly good. In several cases, stenosis occurred, but this was overcome by dilatation with bougies. As regards final results, 21.2 per cent of all the cases operated upon died of local recurrence or of metastases. If only those cases are reckoned which withstood the operation, then Rotter's statistics show a permanent cure in 41.3 per cent of cases.—*Arch. f. klin. Chir.*, bd. lxxx, h. 1, 1906.

M. G. SEELIG.

SURGICAL TREATMENT OF ULCER OF THE STOMACH. By Prof. Dr. Krönlein.

Professor Krönlein, in a paper read before the Congress of German Surgeons, 1906, discusses the surgical treatment of gastric ulcer. He prefaces his paper with the following general statements, which, in his opinion, are accepted by both internists and surgeons:

1. Ulcer ventricula should be treated by the internist, as many patients may be cured or may improve by means of this simple treatment.

2. However, internal treatment of ulcus patients is not always successful: some do not recover nor improve; some die.

3. In those cases resisting internal treatment, operative interference, at times, brings recovery or improvement, while a certain number are not benefited or die.

Krönlein endeavors, in the course of the paper, to answer the following questions: At what period of its course and under what symptoms must surgical supersede medical treatment? Where is the border line between the two methods?

The author briefly reviews the discussions on the question at the various congresses during the last ten years, and states that, so far, a satisfactory solution of the question has not been found. Much was expected in 1897 of a discussion between von Mikulicz and von Leube as authorities on the surgical and the medical aspects of gastric ulcer. No definite conclusions resulted.

The first operation done by Krönlein was in 1887 (ulcus and stenosis). The results in the earlier years were not so good as those of the last decade. Some of the earlier operations are not done now, because his ideas of their relative value and danger have changed. All cases operated on were diagnosed as ulcers. The correction of diagnosis made by the autopsy in vivo explain such terms as "gastrectasy," "gastritis hemorrhagica," "gastroptosis."

1. *Cases* 1887–1906 (*beginning of March*).

Operation	No.	Cured	Died
Ulcus-ulcustenosis	91	79	12
Gastrectasy	3	2	1
Gastrectasy and gastroptosis	3	2	1
Gastritis hemorrhagica	2	2	.....
Ulcus pepticum injej	2	2	.....
	101	87	14

Mortality, 13.8 per cent.

2. *Operations.* On these 101 patients 112 operations were done, as follows:

Operation	No.	Cured	Died
Rectopyloris	4	3	1
Gastro-enterostomy	89	79	10
Pyloroplasty	1	1	.....
Gastrolysis	2	1	1
Gastrotomy	4	4	.....
Excision and suture of ulcer	2	2	.....
Entero-anastomosis	4	4	.....
Cholecystotomy	1	1	.....
Exploratory laparotomy	5	3	2
	112	98	14

Mortality, 12.5 per cent.

3. *Time of Operation (in Course of Disease)—Previous History of Case.* 49 years (57.6 per cent men; 42.4 per cent women).

The majority of cases are said to occur between 25 and 35 years. The more advanced age is probably explained by the fact that most patients seek surgical aid only after a long duration of the disease. Only in 14 cases disturbances had lasted less than one year.

In 23 cases, 2 to 5 years.
In 13 cases, 5 to 10 years.
In 18 cases, 10 to 20 years.
In 11 cases, 20 and more years.

Maximum Duration. 32, 33, 45 years. These later patients died from a perforation.

In more than half the cases, duration of disease exceeded five years.

A case of fresh and uncomplicated ulcer was not observed in the series.

Internal treatment preceded in 70 per cent of the cases (25 per cent with improvement; 45 per cent without result).

Systematic lavage of the stomach had preceded in 28 per cent. One patient used it daily for ten years. Fifteen per cent had been treated in hospitals; ten per cent had been treated by specialists.

Diagnosis of Ulcer—Its Complications and Sequelæ. Difficult at times, when hemorrhage is not present.

Symptoms

	Per Cent
Vomiting	82.3
Hemorrhage	43.8
Fatal hemorrhage	3.8
Local pressure pain	38.0
Enlargement of stomach	76.0
Rigidity of stomach	5.4
Resistance and tumor	34.0
Free hydrochloric acid	80.5
Hyhrochloric acid absent	19.5
Lactic acid	25.0

Solitary ulcer was found 14 times; multiple ulcers, 13 times;—an important fact concerning operative therapy.

Methods of Operation. Gastro-enterostomy most prevalent. Wölfler method, 8 cases; von Haevier method, 66 cases.

Suture used entirely. Murphy button not employed. Good operative results are obtained with gastro-enterostomy, with or without Murphy button. Losses are small.

Krönlein finds marked progress in the fact that the circular vitiosus may be avoided by an eventual anastomosis. He lost four cases by circular vitiosus in former years.

Immediate Results after Operation. In majority of cases, very favorable, as all symptoms disappeared within a short time. This occurred in 65 cases of 72 operated upon. In 7 cases, post-operative condition was not so good. Symptoms less than before, but not entirely absent.

From 1887 to 1904, 85 cases are mentioned who have been thoroughly examined as to immediate and late results by Dr. Kreuger, Krönlein's assistant.

	Cases	Per Cent	
Recovered	65	76.5	84.7
Improved	7	8.2	
Died	13	15.3	
	85		

Late Results. In 5 of 72 (7 per cent), no answer was obtained. In 67 of 72 (93 per cent), answers were obtained. In 38 of 67 (53 per cent), Kreuger examined personally.

Classification of Late Results as to Operations

Operation	Number	Cured	Improved	Unimproved	Died of Complaint	Unknown
Resectio pyloris	3	3	.....	.....	.....	....
Gastro-enterostomy, posterior	60	36	12	6	2	4
Gastro-enterostomy, anterior	3	.....	2	.....	.....	1
Pyloroplasty	1	.....	1	.....	.....	....
Exploratory laparotomy	3	1	1	1	.....	....
Gastrotomy	1	.....	.....	1	.....	....
Excision and suture of ulcer	1	1	.....	.....	.....	....
	72	41	16	8	2	5
		57%	22%	11%	3%	7%

Successful, 79 per cent. Failures, 14 per cent.

Influence of Gastro-enterostomy on Hemorrhage. In 8 of 11 cases where hemorrhage had occurred shortly before operation, this ceased after gastro-enterostomy.

In one case operated upon on account of grave hemorrhage, a fatal hemorrhage occurred four days after operation, due to erosion of the artery by the ulcer.

In two other cases, hemorrhages recurred without assuming dangerous character.

Failures as to Permanent Results

In 2 cases, this was due to improper selection of operative procedure (exploratory laparotomy, gastrolysis, gastrotomy).

In 1 case, probably to insufficient function of gastro-enterostomy fistula.

In the remainder, failure was probably due to persistence of ulcer despite operation.

Two patients, on whom a gastro-enterostomy was performed with temporary results, died later of carcinoma. This cannot positively be prevented by operation. Ulceration of the mucosa may occasionally give rise to a carcinoma.

Summary

1. It is certain that internal treatment in a considerable number of cases does not lead to cure. Immediate results may be clouded by complications or grave sequelæ. These failures amount to a fourth of all treated cases, and have a mortality of 10 (13 per cent).

2. It is certain that many of the patients not benefited by internal treatment have subsequently recovered entirely, or have, at least, greatly improved after operative interference.

3. The immediate losses after surgical treatment of ulcer have greatly decreased within the last years, and amount (considering methods of operation and indications) to about 8 (10 per cent).

4. Late results are quite good: Complete recovery, 61 per cent; marked improvement, 24 per cent. *In toto*, 85 per cent good results after years. Late losses are small, and are usually caused by the comparatively rare occurrence of an ulcus carcinoma (3 per cent).

5. Healing of the ulcers under operative treatment comprises excision of an open ulcer and restitution of the normal motor and secretory functions of the stomach.

6. Examinations by Dr. Kreuger (Surgical Clinic, Zurich) show the following:

(*a*) A gastric dilatation existing previous to operation recedes usually to normal size of the organ. The time is proportionate to the degree of dilatation. If marked dilatation persists, operative results are poor.

(*b*) Previous secretory disturbances disappear in the majority of cases ofter operation.

(*c*) Increased acidity decreases in all cases often to normal, in a few cases to subnormal, and subsequently returns to normal values.

(*d*) If acidity was normal before operation, it goes below normal afterwards and later becomes normal.

(*e*) If acidity was decreased before operation, it becomes normal or is slightly increased. In rare instances it remains stationary or sinks still lower.

(*f*) Free hydrochloric acid is present after operation in the large majority of cases, as a rule in less quantity than before operation; in a small number, it is absent shortly after operation, to return later.

(*g*) In the cases where no free hydrochloric acid was present before operation, it is present again afterwards; in rare cases it may remain absent. Subnormal acidity and absence of free hydrochloric acid may not occasion any subjective symptoms, and cannot be considered as an undesirable sequel to operation.

(*h*) Reflux of bile into the stomach, which occurs frequently, does not cause marked disturbances, and seems to disappear after a time.

(*i*) Regurgitation of pancreatic juice into the stomach cannot be proven very often.

Choice of Operation

7. The keynote of operative treatment of gastric ulcer is not the excision of the ulcer, but rather the production of favorable conditions for rapid cicatrization and normal gastric functions.

8. These conditions are produced by prevention of stagnation and decomposition of gastric contents.

9. No operation meets the indications so completely and is associated with so little danger as gastro-enterostomy, especially von Haevier's retrocolic posterior gastro-enterostomy.

10. Hence gastro-enterostomy is to be considered as the standard procedure in the operative treatment of gastric ulcer. The results with this operation are the more brilliant the more the above-named disturbances complicate the disease (stagnation and decomposition of gastric contents, motor insufficiency, gastrectasis). Hence they are especially good in marked pyloric stenosis, extensive adhesions of the stomach with neighboring organs; i. e., liver, pancreas, etc.

11. In other complications, also, gastro-enterostomy has proven itself effective, as in hemorrhages, and especially in the so-called callous ulcer.

12. Excision of the ulcer should be performed only in exceptional cases. The fact alone that the ulcer is frequently multiple, that, furthermore, the topical diagnosis is often impossible, even when the stomach is exposed, and finally, that the attempt may meet with unsurmountable difficulties, — these speak strongly against this procedure.

13. Pyloroplasty and gastrolysis are obsolete.

14. Pylorus resection may be indicated in stenosis of pylorus and ulcer of pylorus, if the induration, the callous tumor, awaken suspicion of carcinoma. Otherwise gastro-enterostomy is also to be employed here.

Indications for Operative Interference

15. The general indications formulated by von Mikulicz in 1897 remain unaltered. The surgical treatment of gastric ulcer is to be considered

if a persistent and eventually repeated internal treatment yields no results, or if these are of short duration. If, in consequence, the working capacity of the individual or his ability to enjoy life are gravely interfered with by pains, vomiting, dyspepsia, the social status of the patient may also have to be considered. To this Krönlein adds the following:

16. Every stenosis of the pylorus, when diagnosed with certainty, is to be treated by operation. The degree of the stenosis is immaterial.

17. Operative interference may come under consideration in cases of functional motor insufficiency of marked degree (atonic gastrectosis, gastrectasis, and gastroptosis), where internal therapy has been ineffectual and the social condition of the patient demands improvement.

18. Occurrence of small but frequently recurring hemorrhages in the course of an ulcer makes the general indication given in 15 more stringent, and demands gastro-enterostomy. Other methods should not be employed.

19. In large hemorrhages endangering life, it appears safe to postpone the operation until the patient has rallied somewhat. In case of operation in these cases, gastro-enterostomy is preferable to attempts of direct hæmostasis.

20. The early operation of simple gastric ulcer, lately advised by some surgeons, leaves strict indications. E. C. RIEBL, M. D.

GASTRO-MESENTERIC ILEUS. By John M. T. Finney, M. D.

The attention of the author was recently called to this interesting and obscure condition by Zade's article upon the subject (*Beiträge zur klin. Chirurgie*, 1905, bd. 46, s. 388; review SURGERY, GYNECOLOGY AND OBSTETRICS, December, 1905), and by a case occurring in his practice. The patient was a female, aged 46. Two months before admission to the hospital she was operated upon for "womb trouble." Following this operation there had been persistent nausea and vomiting after taking food or water. She had lost in weight and strength; continued unimproved by medical treatment during the following three months, when she was transferred to the surgical clinic.

Physical Examination. "Color good; tongue slightly coated; pulse 92; small. The abdomen seems normal; slight epigastric pulsation. No visible peristalsis, no palpable mass, general abdominal tenderness, probably neurotic. Liver and spleen not palpable, no ascites, no jaundice. Area of stomach tympany normal. Red-blood count, 4,416,000; white-blood count, 5,200; hæmoglobin, 81."

Operation. Stomach found slightly dilated. Pylorus admitted tip of finger. Duodenum slightly dilated. Pyloroplasty performed. Vomiting continued until death.

Autopsy. Upon introducing the finger into the lumen at the duodenum an obstruction was met at the point where the mesenteric vessels cross. The examining finger met with considerable resistance in passing the obstruction, which was relieved upon lifting the intestines out of the pelvis. No lesion was found in the wall of the duodenum at this point. The remaining portion of the small intestine was collapsed and lying in the pelvis.

The clinical picture in these cases so closely simulates that of the condition we recognize as acute dilatation of the stomach that the author raises the question whether or not they may not be one and the same thing. He is inclined, however, to consider them as distinct entities, but he is also convinced that a considerable number of cases which have appeared in the literature as acute dilatation of the stomach are really cases of gastro-mesenteric ileus.

After reviewing the literature and discussing the subject from its various standpoints, the author draws the following conclusions:

1. Acute dilatation of the stomach and gastro-mesenteric ileus cannot be differentiated clinically.

2. Obstruction to the lumen of the duodenum by the root of the mesentery and the contained superior mesenteric vessels has been demonstrated, and is probably of more frequent occurrence than has been supposed.

3. Whether this is primary or secondary to the gastric dilatation, or whether this relationship is a constant one, has not been determined.

4. The diagnosis would appear to be more easy than past failures seem to indicate.

5. The use of the stomach-tube and avoidance of dorsal decubitus offer better results probably than secondary operation, owing to the unsatisfactory conditions existing.

6. With earlier diagnosis and the early institution of the measures just suggested, an improvement in the very high rate of mortality can be confidently expected. — *Boston Medical and Surgical Journal*, August 2, 1906, p. 107.

GEORGE E. BEILBY.

THE RÖNTGEN RAY TREATMENT OF GOITER. By C. Pfeiffer, M. D.

Pfeiffer was led to investigate the merits of the X-ray treatment of thyroid affections by the many favorable reports of its use coming from this country. The study was undertaken in the clinic of Professor Bruns in Tübingen, where,

during a period of eight months, fifty-one cases were treated. We assume from the brief clinical histories of the cases that they represented a variety of lesions; the majority, however, were probably simple colloid hypertrophies or adenomata. There were two cases of carcinoma. To determine what action, if any, the rays had upon normal thyroid tissue, dogs were subjected to prolonged exposure. In all of the treatments, soft or moderately soft tubes were used at a distance of 30 cm. with an induction spark length of 60 cm., 3 to 4 ampere current, and 80 volts. The total duration of exposure varied from 30 to 185 minutes, distributed in sittings of 10 to 15 minutes each. Of the 51 cases treated, 35 were examined in from 4 to 6 months after the first exposure. Eight cases later subjected themselves to operation.

Their results were not favorable. Clinically, there was slight improvement in the subjective symptoms in a few of the cases, often, however, but temporary. A little diminution in the size of the goiter was also at times observed. In two cases a fairly satisfactory cure was obtained; i. e., a marked diminution in the size of the organ and a disappearance of the pressure symptoms.

Histologically, no change whatever was observed which could be attributed to the action of the Röntgen rays, either in the eight cases operated upon subsequent to exposure, in the carcinomatous thyroids, or in the normal thyroids of dogs. Local eczema was a frequent complication.

I quote the following summary of Pfeiffer's article:

1. According to our observation the Röntgen rays have no specific influence upon normal, hyperplastic, colloid, or carcinomatous thyroid tissue.

2. We have never observed a cure of the goiter under the application of the Röntgen rays, in spite of a most careful selection of cases. We have found continuous improvement in 2 cases alone, slight improvement of shorter or longer duration in 25 patients, and indeed no changes in 22 patients. Likewise, carcinoma of the thyroid is not in the slightest degree influenced by the X-rays.

3. On the other hand, we have observed, in spite of most careful precaution, injury to the skin 26 times, varying from slight redness to blister formation.

4. It is a question, in our judgment, whether the slight diminution in the goiter and the lessening of the dyspnœa which were often observed were due entirely to Röntgenization. Perhaps factors quite different enter into it. I think as a first consideration of physiological variations in the hyperæmia of the organ, again of variations in the hyperæmia in consequence of a subsidence of a pre-existing bronchitis, and not as a last consideration the suggestive influence of the new treatment.

Briefly. The Röntgen ray treatment of goiter is a most ineffectual measure which it is better to replace by tried methods. — *Beiträge zur klinischen Chirurgie*, 1906, bd. 48, xlviii, h. 2, p. 367.

GEORGE E. BEILBY.

CONCERNING A THIRD THOUSAND THYROID EXCISIONS. By Professor Theodor Kocher.

Professor Kocher, who, from November, 1900, to August, 1905 — a little less than five years — has operated upon three thousand cases of thyroid lesion, reported, at the last German Surgical Congress, the results of his third thousand cases. They comprised: Simple hypertrophy (including cysts and adenomata), 904 cases; exophthalmic hypertrophy (exophthalmic goiter), 52 cases; malignant disease, 36 cases; and thyroiditis, 8 cases. There were 7 deaths, making a total mortality of 0.7 of 1 per cent. Of the 52 cases of exophthalmic hypertrophy, but one died; of the 36 malignant cases, 3 died; of the 8 cases of thyroiditis, there were no deaths; of the 904 remaining cases of benign lesion (simple hypertrophy cysts and adenomata), there were three deaths, one from hemorrhage in a cachectic patient, one from pneumonia several days subsequent to operation, and one as a result of atrophy and dilatation of heart. This latter group of 904 cases presents the remarkably low mortality of but a little over 0.3 of 1 per cent. This unequaled experience of the author adds great weight to his opinion that in the present stage of surgery, partial thyroidectomy can be performed without danger to life, even in deep-seated glands of great size, and in the aged, provided the heart is sound. According to their records, in 661 robust patients there was but a single death, and this was due to hemorrhage. Wound infection was seldom seen, and never of sufficient severity to endanger life.

Kocher justly sounds a note of warning as to the danger of delayed operation until there is produced the "goiter heart" and other serious organic lesions. In the treatment of exophthalmic goiter he considers that the various so-called specific thyroid preparations have done more harm than good. He emphasizes the fact that physicians should no longer regard operation as a last resort in the treatment of this important condition. — *Zentralblatt für Chirurgie*, 1906, Nr. 28, beilage, p. 70.

GEORGE E. BEILBY.

TRANSPLANTATION OF THYROID TISSUE INTO THE SPLEEN. An experimental and clinical study. By Prof. Dr. E. Payr of Graz.

Payr, in an exhaustive way, reviews the work

done in thyroid transplantation up to the present time, and states that thus far no important results have been attained, and that within the last years interest has seemed to have vanished from this field of clinical surgery. After discussing the adaptability of the spleen as a tissue for thyroid implantation, and giving in detail the technique of his operation, he reports a study of forty-eight animals thus operated upon since 1902, in which clinical and pathological studies were made, and in which later the transplanted tissue was histologically examined. The results obtained in animals convinced him that the method might properly be employed in the human subject in conditions of post-operative tetany, cachexia strumipriva, myxœdema, and sporadic cretinism. He has employed this method in the treatment of one case of cretinism with encouraging results.

His conclusions are as follows:

1. The spleen, on account of its peculiar blood-supply, affords excellent nourishment for transplanted tissues. Circulation in the transplanted tissue is quickly restored, and as a result there is slight if any central necrosis.

2. The chief consideration against this implantation of tissue sections into the spleen is that it excites danger of hemorrhage. Continued animal experiments have resulted in an improved technique, which has obviated largely this danger, the transplanted tissue acting as a living tampon when properly introduced.

3. In the treatment of animals from which the thyroid had been removed, this transplantation enabled the animal to live for months, even as long as three hundred days, without symptoms. This argues that the transplanted thyroid tissue performed its normal function.

4. In the case of a six-year-old imbecilic child (cretin), treated for three and one half years, in vain, with thyroid administration, a large piece of healthy thyroid tissue recently taken from the mother of the child was transplanted into the spleen. The result five months after operation proved satisfactory from a physical and mental standpoint. (Slight increase in height and brightening of mental faculties.)

The treatment is indicated in congenital and acquired athyroidism or where there is defective thyroid function.

5. Organs with an internal secretion seem to adapt themselves better for transplantation than those with an "external secretion." The former possess in the organism a greater independence for self-sustenance, which shows in the transplantation as having a higher degree of vital energy. — *Archiv für Klinische Chirurgie*, 1906, bd. lxxx, h. 3, p. 730.

Remarks. In the subsequent number of this periodical (heft 4), the author reports very favorably upon the condition of this child, nine months having elapsed since the implantation of the thyroid tissue into the spleen. GEORGE E. BEILBY.

TUBERCULOSIS OF THE MAMMARY GLAND AND THE PERMANENT RESULTS OF OPERATIVE TREATMENT. By Dr. E. Braendle. From the Tübingen Surgical Clinic.

Braendle quotes eighteen cases observed by himself and collected from the literature. The important facts brought out may be summed up as follows:

Ætiology

1. *Age.* No case has been seen before the appearance of the menses. Of 11 cases seen in the Tübingen Clinic, 10 occurred between 30 and 50 years.

2. *Pregnancy and Lactation.* Of the 11 cases, 10 had had children. Mandry is quoted as stating that of 24 cases, 16 had had children.

3. *Presence of Tuberculosis Elsewhere in the Body.* Of Braendle's 11 cases, none showed pulmonary tuberculosis, and in only 2 were glandular involvements of a tubercular nature found. Mandry is, however, quoted as stating that half of his cases were otherwise tubercular. Two of Braendle's cases died later of phthisis.

Involvement of Axillary Glands

Braendle states that these are involved in 85 per cent. Mandry's quoted statistics give 68 per cent. It is stated that it is often difficult to tell whether the axillary glands or the breast first become involved.

Pathological Anatomy

Two forms are noted:

1. A type characterized by circumscribed intramammary cold abscesses. This form is less frequently met with.

2. A confluent form. This type was found in most of Braendle's cases. In many cases, fistulæ were present. Often, partially softened nodules adherent to one another are seen.

Clinical Characteristics

1. Breast may be of normal size, but is often enlarged.

2. Nipple frequently retracted — 30 per cent, according to the author.

3. In advanced cases, several fistulæ may be seen.

4. A small, or in some cases a larger, tumor of hard and nodular surface is felt. This may be of even consistency, or may be softened in places.

Tumor, as a rule movable over the underlying tissues, infrequently may be found partially adherent to the pectoralis. More often is adherent to the skin — 70 per cent, according to a quoted author.

5. Axillary glands on the diseased side are most always enlarged.

Differential Diagnosis. Tuberculosis must, as a rule, be differentiated from carcinoma. The mere presence of a hard nodule speaks for either condition. The age is, as a rule, rather advanced in both cases. When fistulæ are present, especially if tuberculosis is elsewhere to be found, a fairly certain diognosis may be made. The most certain method is the inoculation of animals with the fluid obtained from the open lesions.

Therapy. The entire breast, as well as the axillary glands of the diseased side, should be removed. Only in a few cases, where single circumscribed nodules are present, may a partial extirpation be done. In ten of Braendle's cases a complete amputation was done, the patients being able to go home in eight to fourteen days.

Later Examination. Of the 18 reported cases, 16 could be seen later. In 15, a permanent cure is recorded. One case recurred. — *Ueber die Tuberkulose der Brust drüse und die Dauer-resultate ihrer operativen Behandlung. Beiträge zur klinischen Chirurgie*, vol. 1. W. C. DANFORTH.

THE RÖNTGEN TREATMENT OF MALIGNANT LYMPHOMATA AND ITS RESULTS. By Dr. C. Pfeiffer, Assistant in the Tübingen Surgical Clinic, Professor von Bruns, Director.

Pfeiffer gives details of a case treated in von Bruns's Clinic, and also quotes extensively from the literature. The quoted cases are divided into three groups:

1. Those observed only for a short time, 10 in number; 2. A group of 14, which were followed up to 9 months; and 3. A group of 9 cases, which were observed for a longer period than 9 months.

No attempt is made to give end results of the first group of cases.

Of the second group, 4 cases showed no changes (2 of these died in a short time). A temporary improvement with almost invariably a recurrence was observed in 7 cases. A good result is noted in only 3 cases.

Of the third group, all improved under treatment, but in 6 cases recurrences appeared. In spite of renewed treatment, 2 of the 6 died. In only 3 was a more permanent improvement noted.

The technique, as noted by Pfeiffer, consists in the use of medium-soft to hard tubes for a period of from one to fifty minutes, varying with the author quoted. It is noted that Finch made use of a "Röntgen-ray bath," whereas other quoted writers treated the glandular masses separately.

Erythema, eczema, and pigmentation were repeatedly observed. Slight disturbances of general health, such as vomiting or diarrhœa, were also seen. Two cases of exudative pleuritis of treatment of the mediastinal glands are reported by Tuadrone and Heineke.

Pfeiffer notes that of the 33 cases which have appeared in the literature during the past three years, 7, or 21.2 per cent, have died. Of those treated and watched for a period longer than nine months, 70 per cent showed recurrences.

The results of Pfeiffer's study are summed up as follows:

1. Röntgen-ray treatment of malignant lymphomata can cause temporary improvement.

2. Results are not to be expected in every case.

3. Permanent recoveries do not exist up to the present time. Whether they occur at all seems questionable, as almost all cases (70 per cent) recur.

4. Recurrences may appear late, even after fourteen months, and often, in spite of renewed treatment, result fatally.

5. Damage to neighboring tissues of slight or severe degree can never be absolutely excluded.

6. That the results of X-ray treatment of malignant lymphomata are materially better than those of former methods seems certain. — *Die Röntgenbehandlung der malignen Lymphome und ihre Erfolge. Beiträge zur klinischen Chirurgie*, vol. i.

W. C. DANFORTH.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF GYNECOLOGY

UNDER THE CHARGE OF

J. CLARENCE WEBSTER, M.D. — E. C. DUDLEY, M.D.
JOHN C. HOLLISTER, M.D — F. W. LYNCH, M.D.

URETHRAL BACTERIA AS A FACTOR IN THE ÆTIOLOGY OF CYSTITIS IN WOMEN. By Fred J. Taussig, St. Louis, Missouri.

With the view of determining whether the female urethra normally contains organisms capable of producing cystitis, the author has studied the urethral secretion of fifty cases, the result of which he presents as his candidate's thesis to the American Gynecological Society.

It would appear that such investigation is timely, not only because comparatively few investigators have turned their attention to this subject, but because, most unfortunately, their results are apparently most contradictory. Thus in a series of 660 observations, made by six authors in fourteen series, the percentage of pathogenic bacteria varied from *nil* to 76 per cent. After careful tabulation of these cases, Taussig believes that the varying results are due to the following causes:

1. Difference in the character of the cases investigated. (Ambulatory patients, patients confined to bed, pregnant women, puerperal cases.)

2. Difference in the preliminary preparation of the urethra.

3. Difference in the quantity of material removed for examination.

4. Difference in the character of the media used for bacteriological development.

5. Difference in the exactness with which individual colonies were studied before their identification was considered complete.

6. Difference in the conception of what constitutes a pathogenic organism.

The author calls attention to the fact that Baisch found that perfectly healthy women, after being confined to bed for several days, showed an increase in the number of pathogenic germs in the urethra. Therefore the author divides his cases into two series: (*a*) Ambulatory cases; (*b*) Cases confined to bed. Inasmuch as the use of antiseptics may inhibit the growth of the organisms, the author cleansed the vestibule and urethral orifice merely with sterile cotton. A platinum loop was used to obtain the cultures, care being taken to obtain smears from the interior of the urethra, some half-centimeter above the orifice, and to avoid coming in contact with the edge of the meatus. Agar plates were used for inoculation, and the recognition of colonies was limited to streptococcus, colon, staphylococcus aureus and albus, which Brown and Baisch have shown to be the cause of the great majority of catheter infections in women.

The author's results were as follows:

Number of Cases	Pathogenic Bacteria	Staphylococcus Albus	Staphylococcus Aureus, in Combination with Albus	Coli	Streptococcus	Other Bacteria	Sterile
40 out-clinic cases ...	62.5%	57.5%	2.5%	5%	5%	42%	17.5%
5 bed patients	80%	60%	.....	20%	...	80%	20%

(None of these patients had acute pelvic inflammation or any disease of the urinary tract.)

The author also states that pathogenic organisms were found more often in the small urethra of nulliparous women under thirty, and less often in the larger urethra of multiparous women over thirty. In two cases with complete prolapsus uteri, the urethral cultures were sterile.

In order to ascertain whether organisms are carried into the bladder by catheterization, the author made eight tests. First, the urethral secretion was obtained in the manner of the previous research. Then a sterilized catheter was introduced into the bladder and the first ten cubic centimeters of urine was caught in a sterile vessel, and subjected to bacteriologic investigation. In six of the eight cases the bacteria found in the urine were identical with those cultivated from the urethra. Cultures from the urine and urethra were sterile in the two other cases.

The author next considers the prophylactic measures which may be utilized to guard against catheter infection, and considers first the effect of irrigation of the urethral orifice. It would appear that the normal flow of urine tends to cleanse the

urethra. Thus, Baisch found that in patients who were confined to bed and were allowed to urinate only twice in twenty-four hours, the urethra invariably contained colon bacilli after five days, thus indicating that the multiplication of urethral flora can be limited by increasing the number of urinations, and the total amount of urine voided. Melchior endeavored to disinfect the urethral orifice with three-per-cent carbolic acid solution, and then introduced a sterile catheter and collected the last portion of urine in the bladder. In nine men and women so examined, the urine was never sterile. Where, however, the urethra was irrigated ten times with a boric acid solution, he obtained in seven cases a urine free from all bacteria.

The author sought to determine to what extent irrigation would cleanse the urethra. The urethra was irrigated in three cases with sterile water, and a drop of prodigiosus culture containing approximately one million bacilli was smeared over the urethra of each case. The urethra was now again irrigated with 150 c.c. of sterile water and cultures taken from the urethra. In each of the three cases, colonies developed, nineteen, twenty-one, and twelve colonies at the end of two days, thus suggesting that irrigation is not entirely protective if the number of urethral bacteria is large.

Nor would it seem that there are at present double or shield catheters which will prevent the actual catheter from coming into contact with the urethra and from introducing urethral organisms into the bladder. Among those recently invented are the instruments of Gersuny, Melchior, and Rosenstein. The author tested the efficacy of the Rosenstein catheter in the following experiment. The urethra was inoculated with cultures of bacillus prodigiosus, and the first portions of urine recovered by catheterization were subjected to bacteriologic investigation. As a control of the number of bacteria originally introduced into the urethra, media was inoculated with three loops taken from the urethral secretion, and the number of developing colonies were counted, with the following result:

No. of Case	Number of Prodigiosus Colonies on Control-plate	Number of Prodigiosus Coloniesin 5–10 c.c. of Urine, Obtained with Rosenstein Catheter
1	32,000	42
2	20,000	6
3	120	7
4	30,000	3
5	3,000	7
6	3,000	1
7	1,000,000	89
8	1,000,000	95

The results of these tests would appear to be that the Rosenstein instrument reduces the number of germs introduced into the bladder, but does not provide us with a means of sterile catheterization. The author believes that it is impossible for a shield devised on the principle of a speculum, as in both the Rosenstein and Melchior catheters, to prevent the transplantation of germs, first from the meatus to the end of the shield, and then from the end of the shield by means of the catheter into the bladder. Until some more practicable form of double catheter is devised, the author advocates the ordinary glass catheter, and in cases in which repeated catheterization becomes necessary, the irrigation of the urethra as a preliminary measure, and after catheterization, the irrigation of the bladder with boric solution, as well as the use of urotropin given by mouth.—*American Journal of Obstetrics*, Oct., 1906. F. W. Lynch.

Sclerotic Changes in the Uterine Vessels and the Hemorrhage of the Menopause. By Kurt Wittek.

The author calls attention to the troublesome cases of metrorrhagia at time of the menopause, and the futility of treatment by ordinary methods. During the last seven years in the General Hospital of Breslau, hysterectomy has been performed twelve times for cases of uncontrollable hemorrhage, with the clinical diagnosis of arteriosclerosis of the uterine vessels. This series is the subject of his study. Careful study of eight cases necessitated their exclusion from the series proper, inasmuch as careful pathological study of the specimens revealed other lesions, which might also account for the hemorrhage. There remained, therefore, four cases, of which three had borne children, while one had never been pregnant. The author believes, as a result of his study, that there is a large proportion of cases complaining of uncontrollable hemorrhage in which arterio-sclerosis of the uterine vessels could be demonstrated.

Many authors have believed that a primary affection of the vessels of the uterus has been responsible for certain instances of uterine hemorrhage, and have described them as the pathological process, a degeneration of a hyaline nature followed by repair by connective-tissue formation. There arises, also, especially at the menopause, an increased growth of elastic tissue in the body of the uterus, which therefore limits the contractability of the organ. Hemorrhage occurs, which cannot be controlled by nature, inasmuch as the normal uterine contractions are impaired. The administration of

ergot, therefore, is without value, and indeed it would appear to increase the bleeding. Hence its use is contraindicated in such cases.

The author believes that the degeneration of the arteries is primarily in the intima, thus differing from the theory of Thoma, which is so widely held. The other steps of the process are: Proliferation of the cells of the media, then of the media followed by degeneration, and the later deposition of salts. He ascribes as the ætiological factor, pregancy in three cases, and a vasomotor neurosis in one case, the former factor accomplishing senile changes in the uterine vessels. A mechanical factor must also be considered as of ætiological moment; viz., the obliteration of the capillaries in the fundus with a coincident dilatation of those of the cervix. The occlusion of the former set of vessels increases the local blood-pressure, and bleeding results through the dilated capillaries of the cervix. Congestion of the pelvic organs was noted in all of the author's cases. — *Die Sklerotischen Gefäss veränderungen des Uterus bei Nulli- und Multiparen und die Klimakterischen Blutungen. Monatsschrift für Geburtshülfe und Gynäkologie*, June, 1906, vol. xxiii, No. 6. F. W. Lynch.

The Results of Vaginal Hysterectomy for Carcinoma. By Albert Blau.

In this paper the author summarizes the experience of the Chrobak clinic with operations by the vaginal route during the years 1890 to October, 1903. There were found, during this space of time, cancer of the uterus in 3 per cent of all women applying for treatment to the clinic; 1,808 cases in 60,000 cases. Of these cases, 20.5 per cent were adjudged to be operable by the combined abdominal and vaginal route, while 18.5 per cent were considered as operable by the vaginal method.

The 309 cases operated by the vaginal route were classified as follows:

Carcinoma of the portio, 226 cases; carcinoma of the cervix, 45 cases; carcinoma of the body of the uterus, 36 cases; carcinomatous polyps, 2 cases.

Or, cancer of the cervix, 271 cases (87.7 per cent; cancer of the body of the uterus, 36 cases (11.65 per cent).

The primary mortality of the operation was found to be 5.8 per cent. Of the 291 cases that survived operation, only 39 escaped observation. Counting the cases which presented no recurrence five years after operation as cured, we obtain the following: 18.5 per cent of the total cases were considered operable; of these, 30.4 per cent survived 5 years without signs of return of the disease; therefore we may consider that an absolute cure resulted in 5.64 per cent of cases.

The cases adjudged to be cured include 25 per cent of the cancers of the cervix, and 76.4 per cent of cancers of the uterine body. Twelve of the original 309 cases were found to have survived operation, and present no sign of return of the growth for a period longer than ten years.

Since 1897, methods of igni-extirpation have been attempted in 113 cases, with a primary mortality of 6.19 per cent. The causes of death in these seven cases were found to be: Peritonitis in 4 cases; pyæmia, marasmus, and death from anæsthesia, each, one case. Five or more years have elapsed since the operation in 31 cases. Of these, 6 were lost sight of, and one died of old age at 74 years, without signs of recurrence. Eleven of the remaining 24 cases presented no sign of return of the growth five years after operation; a percentage of the 24 of the 31 cases of 45.8 per cent. Twenty of the 24 cases were cancer of the cervix, with cure in 40 per cent, while three of the four cancer of the uterus cases also were adjudged cured.

In conclusion, the author believes that, all things considered, the vaginal route with wide excision of the growth will cause smaller primary mortality than the abdominal route. — *Ueber die Erfolge der Vaginalen Uterus Exstirpation Wegen Karzinom. Beiträge zur Geburtshülfe und Gynäkologie*, vol. x, pt. 3. F. W. Lynch.

BOOK REVIEWS

SURGERY: ITS PRINCIPLES AND PRACTICE. By various authors. Edited by William Williams Keen, M. D., LL. D. Volume I. 261 text illustrations and 17 colored plates. Philadelphia: W. B. Saunders Company. 1906.

The first volume of Surgery is a very compact one. Its thousand pages are printed on good paper and with good, clear type, and contain twenty per cent more reading-matter than the average volume of the same bulk. The few illustrations here reproduced are examples of the excellent work done along that line. There are twenty-two chapters, by thirteen different authors. One of the things which stand out prominently throughout the book is the bibliography accompanying nearly every chapter, in most cases exceptionally full and complete. A good bibliography connected with each of the subjects making up a text-book is not a novelty, but this feature is altogether too infrequent in American text-books. There is no reason why a text-book should not give a bibliography as complete and up to date as that expected in a monograph or magazine article. There can be no doubt that the value of the book is thereby very materially increased. In this connection one is reminded of the bibliography of the German edition of "Von Bergmann's System." The first chapter is a purely historical sketch; the sixty pages devoted to it are of real value. The history of medicine is a subject with which the average student hardly comes in contact; he loses a great deal by his lack of familiarity with the lives and the works of the men who have made of medicine a real art.

The chapter on surgical physiology expresses, as one would expect of its author, Dr. George W. Crile, the latest thought on the subject to the advancement of which he himself has done so much. The clinical value of exact observations on blood-pressure, etc., are discussed, and their application in operative surgery shown in a rather short chapter. There is a good, short chapter on the examination of the blood.

The theoretical aspect of infection and immunity is presented by Dr. Ludwig Hektoen in a concise and lucid chapter, with a bibliography that is sufficiently complete to enable one to get what is best in the literature.

Dr. John George Adami takes up the subject of inflammation under a definition sufficiently broad to include all the local reactions of tissues to injury or irritation, bacterial or otherwise. His chapter is clearly written and well illustrated. The chapters on suppuration, ulceration, and gangrene are very complete. The chapter on repair of tissues stands out prominently among the other good chapters, with its excellent illustrations and its exceptional bibliography, the latter giving evidence of most painstaking care.

Dr. Charles Harrison Frazier, in the chapters on erysipelas, tetanus, diseases caused by special infections, and diseases derived directly from animals, insects, and reptiles, presents his subjects in a uniformly satisfactory manner. His bibliography is particularly good. He presents the latest thought regarding the pathogenesis of tetanus as developed by Meyer and Riensom and Marie and Morax. Under therapeutic considerations he recognizes the "great disparity between the effects of the administration [of antitoxin] as a prophylactic and as a curative agent," and discusses its comparative failure in the latter action in connection with our recently acquired knowledge of the fact that toxins reach the cord only through the motor nerves.

The subdural injections of "morphine-eucaine and salt solution" and of "magnesium sulphate," as recently recommended by Murphy and Melzer, respectively, are considered in some detail.

Malignant œdema and emphysematous gangrene are taken up as applying to a single disease, though in the text there is a vague differentiation of the two conditions.

Surgical tuberculosis is taken up in a rather well-balanced chapter. There is, of course, not much new to be added to the chapter on surgical tuberculosis. Wright's work is too recent to be considered in a work of this sort, in connection with either diagnosis or treatment. The author feels that the term "scrofula" has a real place in medical nomenclature.

Syphilis is treated more fully than is commonly foud in a text-book on surgery, and the chapter is particularly well illustrated.

The chapter on tumors, by John Bland Sutton, occupying something over one hundred pages, is on a par with the monograph on the same subject by the same author. His classification is similar to that used in his monograph. He discusses odontomata under a separate heading, entitled "Tumor-

FIG. 77.—SCARS OF HEALED BEDSORES ON THE SHOULDERS, ELBOWS, SACRUM, POSTERIOR SPINE OF THE ILIA AND GREAT TROCHANTERS AFTER TYPHOID FEVER (Keen).

DIABETIC GANGRENE (Case of J. F. Binnie).

diseases of Teeth," and chorion-epitheliomata under a separate group, entitled "Tumors Arising from Fœtal Membranes."

The volume ends with a chapter on wounds and contusions, by George W. Crile, in connection with which he treats of shock and collapse, and considers their treatment.

If this volume is a fair representative of what we may expect of the complete work, there is little question of its true value to the profession. It will be a distinct addition to modern scientific surgery, and cannot fail to inspire confidence in its readers. We do not hesitate to predict for the complete work a well-merited success.

H. M. RICHTER, M. D

AMERICAN PRACTICE OF SURGERY. A complete system of the science and art of surgery, by representative surgeons of the United States and Canada. Editors: Joseph D. Bryant, M. D., and Albert H. Buck, M. D. Vol. I. New York: William Wood & Co. 1906.

In reviewing this, the first volume of the Bryant and Buck system of surgery, our first thought is, Can this be taken as a standard of the volumes that are to follow? If this question can be answered in the affirmative, one has no hesitancy in making the broad statement that the work will accomplish what its editors have hoped for.

It will give to the profession a clear portrayal of surgery as it is practised in the United States and Canada at the present time.

The introduction reviews the evolution of American surgery, and contains short but interesting sketches of the lives and work of the men whose research and teachings made the surgery of to-day possible.

Part I, dealing with inflammations, contains an exhaustive and comprehensive description of the later theories of this complex process. It deals with histological changes resulting from the effect of the causative agent, and considers the protective factors at some length.

Disturbances of nutrition are also taken up in this section. Under this title the author treats hypertrophy, atrophy, infiltrations, necrobiosis and necrosis, ulcerations and caries, and anæmia.

The processes of repair are at first discussed from a general viewpoint, and then these general principles applied to the repair of special tissues. This chapter is especially well illustrated, giving the student a clearer conception of the various processes.

The subject of new growths is considered under several headings: Tumors and Tumor Formation; Theories of Tumor Formation; and Parasitical Relations of Cancer. Nicholls has given the newer classification of tumors according to Adami. This classification is based upon the differentiations of the primitive cell layers in early fœtal life. While this classification is scientific, it must be admitted that it is somewhat ambiguous.

McGraw, writing of the theories of tumor formation, believes that some attention should be given to the possibility of a nervous control of tumor formation.

The chapter entitled "Parasitical Relations of Cancer" is a complete *résumé* of the subject to date, together with the results of the author's experiments and conclusions.

Part II begins with a consideration of wound infections, and it would seem to us that this chapter is hardly up to the standard of the other parts of the volume. On page 42, the author treats of the production of "gas abscesses and spreading emphysema." This process is attributed to the bacillus of malignant œdema, the Welch bacillus not being mentioned.

Surgical shock is considered in a separate chapter, and the subject is treated exhaustively. Howells's "Conclusions on Shock" are given, with a criticism of some of Crile's deductions. Shock is also discussed from the standpoint of its relation to anæsthesia, hemorrhage, anæmia, etc. This chapter is perhaps one of the most complete and instructive parts of the volume.

Part III, entitled "General Surgical Diagnosis," is especially complete. The subject is taken up under special headings and treated in a most systematic manner.

Radiography as a diagnostic aid in surgery and its intelligent application is considered under two headings, "The Epiphyses and their Radiographic Interpretation," "The Technique of Radiographic Work as Applied to Surgery, and the Interpretation of Radiographs."

The concluding chapter is devoted to "General Principles of Surgical Treatment," dealing with infections and their prevention, including disinfection and sterilization.

It would seem to us that one concrete criticism of the volume may, in justice, be made. We wish to enter a plea for a more complete bibliography as an affix to the different chapters, believing that it would add materially to the value of the volume. Some, but not all, of the authors have complied with this suggestion.

No apology need be offered by the editors for the repetition that is noted in the discussion of allied subjects. This is an indication that there have been no limitations placed upon the various authors. They have been allowed to exercise their own

judgment as to the best method of considering a given subject.

As a publication, this volume seems to stand for all that is superior in the publisher's art. The binding is good, with flexible back, the paper is thick, and the type large, clear, and very readable.

The work is profusely illustrated with well-executed and instructive plates.

If the remaining volumes maintain the standard established by this volume, we can say from an abstract survey that we believe it will be the most scientific and complete system of surgery that has yet appeared in the English language.

The complete work can hardly fail to receive the commendation of the entire profession, and command the confidence of all its readers.

F. A. Besley.

The Practice of Gynecology. In original contributions by American authors. Edited by J. Wesley Bovée, M. D. Illustrated; 382 engravings and 60 full-page plates; text 812 pages. Philadelphia and New York: Lea Brothers and Company. 1906.

This volume is offered to the profession as a practical treatise on the diseases of the generative organs of women and on those of neighboring organs, the urinary system and rectum. Its scope is intentionally made broader than that implied in the technical definition of gynecology. The book has been planned to be eminently practical, and in order to make it such, due consideration has been given to the conditions actually met by the gynecologist in his work from day to day. It is obvious that, in women, diseases of the rectum and urinary system are closely related to those of the female generative organs, as those organs are in such a position that the vicissitudes of pregnancy, labor, and the marital relations must of necessity modify the anatomy, physiology, and pathology of the structures both in front of and behind the genital tract. One has only to instance the wounding of the rectovaginal septum in labor, or the pressure upon bowel, bladder, and ureters in the pregnant uterus, or tumors of the ovaries or uterus, to prove this statement. In a word, an endeavor has been made to place before the medical profession a book that will be of interest not only to the gynecologist and surgeon, but also to the large body of general practitioners. It is no reflection upon the many excellent individual treatises to point out that they can scarcely be expected to exhibit the status of the subject as fully as is possible by the collaboration of several accurate observers. To secure the advantage of this breath of view, the present work has been written by seven members of the medical profession of America, under the editorship of one of them.

Each contributor has striven to reflect the results of scientific investigation in an impartial and interesting manner. A departure from the usual classification of diseases has been made in this work, pathology and bacteriology being chosen as the chief guides, in view of the more rational and logical arrangement thereby attainable. This will be particularly noted in the consideration of vaginitis, endometritis, salpingitis, ovaritis, and peritonitis.

This excellent work is edited by J. Wesley Bovée, M. D., who has thereby added to his laurels as a surgeon and a frequent contributor to gynecological literature, the additional distinction of a successful organizer and text-book maker.

The book is written by practical men in the prime of life, actually engaged in the practice of the specialties of which they write, selected for their special fitness for the actual work assigned to them. This appeals to one as a better way of writing an authoritative work, than the writing of a complete work on a broad specialty by one man, because no one man nowadays is expected to write with the same keenness and authority on every branch of a specialty so large and comprehensive as gynecology as on one branch of it. This fact not only appeals to one theoretically, but in the Bovée book we have a forcible illustration of the fact. Every portion of the book bears the stamp of authority, which, combined with preciseness of statement, compels respect and confidence.

Dr. Bovée writes on sterility, diseases of the rectum and anus, abnormal conditions of the urinary tract in women — surgical conditions of the kidney, surgical conditions of the ureter, affections of the bladder in the female and affections of the urethra in the female, developmental anomalies of the female generative organs.

Dr. J. Riddle Goffe writes on menstruation, displacements of the uterus, the vaginal method of operating, abdominal operations — their after-treatment and complications.

Dr. George H. Noble writes on urinary fistulæ connecting with the female generative organs and the rectum, lacerations of the perineum, fæca fistulæ connecting with the female generative organs, diseases and injuries of the vulva and vagina.

Dr. X. O. Werder writes on examination of pelvic contents, technique of abdominal operations, and extrauterine pregnancy.

Dr. Thomas J. Watkins writes on infections of the Fallopian tubes and ovaries — general considerations, infections of the Fallopian tubes, and infections of the ovaries.

Dr. G. Brown Miller writes on inflammation of the uterus, lacerations of the cervix — subinvolution and hyperinvolution of the uterus, inversion of the uterus, fibromyomata of the uterus, the treatment of fibromyomata of the uterus, malignant tumors of the uterus.

Dr. Benjamin R. Schenck writes on anatomy of the Fallopian tubes and ovaries — diseases of the Fallopian tubes (exclusive of infections) and extrauterine pregnancy, diseases of the ovary (exclusive of infections).

A careful persual of this 900-page book has convinced the reviewer that it has been conscientiously written by the men who have undertaken the work. While the different portions bear the stamp of each individual author's personality, the editor has been so judicious in selecting authors whose attainments and authority in the particular work assigned them are so well recognized, that one willingly overlooks the differences in style and the occasional repetitions.

The book is a good one for practitioners and inexperienced and experienced operators to follow. It seems to a mirror of the methods of the individual writers, rather than an encyclopædia of bibliography or an enumeration of historical curiosities or experimental practice. It is a practical book for the practitioner, rather than a reference-book for the specialist. It is a work that one can conscientiously recommend as one of the best written on the practice of gynecology that has appeared this year.

It is published by Lea Brothers, and that means that the mechanical part of the book-making is well done. FRANKLIN H. MARTIN.

TEXT-BOOK OF MEDICAL JURISPRUDENCE AND TOXICOLOGY. By John J. Reese, M. D. Seventh edition, in one volume; pp. ix, 649. Revised by Henry Leffman, A. M., M. D. Philadelphia: P. Blakiston's Son & Co. 1906.

This compact volume embodies all the essential parts of the science of medical jurisprudence, and treats of the different subjects in an admirable way. The book is thoroughly up to date, and will, no doubt, be of value to the student of law or medicine, as well as to the practitioner who wishes to familiarize himself with the whole or a part of the science. Quite a number of apt and helpful illustrative cases are cited throughout the book, which explain and corroborate the statements set forth in the text. Owing to the magnitude of the subject-matter that properly falls within the scope of medical jurisprudence, most topics have not been presented as exhaustively as they might have been had the space been less restricted. The condensing has, however, been skillfully done without a sacrifice to the important component parts, and as a result this work fills its purpose as a convenient text-book. In common with many works on medical jurisprudence, the author dwells upon the various subjects, principally from the viewpoint of the medical man, elaborating and laying most stress upon the medical side of the questions involved. The book is not illustrated.

S. THOMSEN-VON COLDITZ.

BOOKS RECEIVED

POKER JIM, GENTLEMAN; AND OTHER TALES AND SKETCHES. By G. Frank Lydston, M. D. Chicago: Monarch Book Company.

HANDBOOK FOR MIDWIVES AND MATERNITY NURSES. By Comyns Berkely, B. A., M. B., B. C. (Cantab.); M. R. C. P. (Lond.); M. R. C. S. (Eng.); Assistant Obstetrical Physician to Middlesex Hospital; Lecturer in Midwifery to Middlesex Hospital; Physician to Out-patients at Chelsea Hospital for Women; Examiner in Midwifery to Central Midwives Board. 283 pp.; 58 illustrations. Chicago: W. T. Keener & Co. 1906. $1.25 net.

PRACTICAL TEXT-BOOK OF MIDWIFERY FOR NURSES. By Robert Jardine, M. D. (Edin.); M. R. C. S. (Eng.); F. F. P. & S. (Glasg.); F. R. S. (Edin.); Professor of Midwifery in St. Mungo's College, Glasgow; Senior Physician to the Glasgow Maternity Hospital, Glasgow; Examiner in Midwifery to the Scottish Conjoint Board; formerly Examiner in Midwifery to the University of Glasgow; late President of the Glasgow Obstetrical and Gynecological Society; author of Clinical Obstetrics. 276 pp.; 49 illustrations. Third edition. London: Henry Kimpton. Chicago: W. T. Keener & Co. 1906. $1.50 net.

ATLAS AND TEXT-BOOK OF HUMAN ANATOMY. By J. Sobatta, Professor of Anatomy in the University of Würtzburg. Edited, with additions, by J. Playfair McMurrich, A. M., Ph. D.; Professor of Anatomy in the University of Michigan. Volume I — Bones, Ligaments, Joints, and Muscles. 320 illustrations, mostly in colors. Philadelphia and London: W. B. Saunders Company. 1906. Cloth, $6.00 net; half morocco, $7.00 net.

A TEXT-BOOK OF OBSTETRICS. By Barton Cooke Hirst, M. D., Professor of Obstetrics in the University of Pennsylvania; Gynecologist to the Howard, the Orthopedic, and Philadelphia Hospitals, etc. Fifth edition, revised and enlarged. With 767 illustrations, 40 of them in colors. Philadelphia and London: W. B. Saunders Company. 1906. Cloth, $5.00 net; half morocco, $6.00 net.

THE PRACTICAL MEDICINE SERIES. Comprising ten volumes on the year's progress in medicine and surgery, under the general editorial charge of Gustavus P. Head, Professor of Laryngology and Rhinology, Chicago Post-Graduate Medical School. Volume VII — Pediatrics, edited by Isaac A. Abt, M. D., Assistant Professor of Medicine (Pediatrics Department), Rush Medical College. Orthopedic Surgery, edited by John Ridlon, A. M., M. D., Professor of Orthopedic Surgery, Northwestern University Medical School, with the collaboration of Gilbert M. Bailey, M. D., Instructor in Orthopedic Surgery, College of Physicians and Surgeons. Series 1906. Chicago: The Year-Book Publishers. $1.25 net.

A TEXT-BOOK OF GENITOURINARY DISEASES, INCLUDING FUNCTIONAL AND SEXUAL DISORDERS IN MAN. By Leopold Casper, M. D., Professor in University of Berlin. Translated and edited, with additions, by Charles V. Bonney, B. L., M. D., Assistant Demonstrator in Anatomy, Jefferson Medical College; Surgeon to the Southern Dispensary, Philadelphia. 213 illustrations and 24 full-page plates, of which 7 are in colors. Philadelphia: P. Blakiston's Son & Co. 1906. $6.00 net.

AMERICAN ILLUSTRATED MEDICAL DICTIONARY. A new and complete dictionary of the terms used in medicine, surgery, dentistry, pharmacy, chemistry, and the kindred branches, with their pronunciation, derivation, and definition, including much collateral information of an encyclopædic character. Together with new and elaborate tables of arteries, muscles, nerves, veins, etc., of bacilli, bacteria, strepococci, diplococci, ptomaines, leucomaines, weights and measures, eponymic tables of diseases, operations, signs, symptoms, tests, stains, method of treatment, etc. By W. A. Newman Dorland, A. M., M. D., Assistant Obstetrician to the University of Pennsylvania Hospital; editor of the American Pocket Medical Dictionary; Fellow of American Academy of Medicine. Fourth revised edition. Octavo; pp. 836; 293 illustrations, 119 in colors. Philadelphia and London: W. B. Saunders Company. 1906. Flexible morocco, $4.50 net; thumb-indexed, $5.00 net.

PRACTICAL MEDICINE SERIES. Comprising ten volumes on the year's progress in medicine and surgery. Under the general editorial charge of G. P. Head, M. D., Professor of Laryngology and Rhinology, Chicago Post-graduate Medical School. Vol. IV — Gynecology. Edited by E. C. Dudley, A. M., M. D., Professor of Gynecology, Northwestern University Medical School, and C. V. Bachellé, M. S., M. D., Gynecologist to the German Hospital, Chicago. Series 1906. Cloth, pp. 227, $1.25. Chicago: The Year Book Publishers.

A TEXT-BOOK ON THE PRACTICE OF GYNECOLOGY. For practitioners and students. By W. Easterly Ashton, M. D., LL. D., Professor of Gynecology in the Medico-Chirurgical College of Philadelphia. Third edition, thoroughly revised. Octavo; 1096 pp.; 1057 original line drawings illustrating the text. By John Altenader. Philadelphia and London: W. B. Saunders Company. 1906. Cloth, $6.50 net; half morocco, $7.50 net.

THE PRACTICE OF GYNECOLOGY. In original contributions by American authors. Edited by J. Wesley Bovée, M. D., Professor of Gynecology, George Washington University, Washington, D. C. With 382 engravings and 60 full-page plates. Philadelphia and New York: Lea Brothers and Company. 1906.

A MANUAL OF MIDWIFERY. By Thomas Watts Eden, M. D., C. M. (Edin.), F. R. C. P. (Lond.); Assistant Obstetric Physician and Lecturer on Practical Midwifery, Charing Cross Hospital; Physician to Out-patients, Queen Charlotte's Lying-in Hospital; Physician to In-patients, Chelsea Hospital for Women; Examiner in Midwifery and Diseases of Women at the Conjoint Board of the Royal Colleges of Physicians and Surgeons; late editor of the *Journal of Obstetrics and Gynecology of the British Empire*. With 26 plates, and 233 illustrations in the text. $4.20, net. Philadelphia: P. Blakiston's Son & Co. 1906.

THE PRACTICAL MEDICINE SERIES. Comprising ten volumes on the year's progress in medicine and surgery. Under the general editorial charge of Gustavus P. Head, M. D., Professor of Laryngology and Rhinology, Chicago Post-graduate Medical School. Vol. IV — General Medicine. Edited by Frank Billings, M. S., M. D., Head of the Medical Department and Dean of the Faculty of Rush Medical College, Chicago, and J. H. Salisbury, M. D., Professor of Medicine, Chicago Clinical School. Series 1906. Chicago: Year Book Publishers.

OBSTETRICS FOR NURSES. By Joseph B. De Lee, A. M., M. D., Professor of Obstetrics, Northwestern University Medical School; Obstetrician to Mercy, Wesley, Provident, Cook County, and Chicago Lying-in Hospitals. Second edition, thoroughly revised and enlarged. 12mo; 510 pages; fully illustrated. Philadelphia and London: W. B. Saunders Company. 1906. Cloth, $2.50 net.

STUDIES IN THE PSYCHOLOGY OF SEX — EROTIC SYMBOLISM, THE MECHANISM OF DETUMESCENCE, THE PSYCHIC STATE OF PREGNANCY. By Havelock Ellis. 6⅜ x 8⅞ inches. Pp. x, 285. Extra cloth, $2.00 net. Sold only by subscription to physicians, lawyers, and scientists. Philadelphia: F. A. Davis Co.

177

UNIV. OF MICH.
DEC 17 1906

TABLE OF CONTENTS OPPOSITE NEXT PAGE

Surgery, Gynecology and Obstetrics

AN INTERNATIONAL MAGAZINE, PUBLISHED MONTHLY

Vol. III No. 6. DECEMBER, 1906 $5.00 Per Year

EDITORIAL STAFF

Nicholas Senn, M. D.

John B. Murphy, M. D. J. Clarence Webster, M.D. C. S. Bacon, M. D.
E. Wyllys Andrews, M.D. E. C. Dudley, M. D. Rudolph W. Holmes, M.D.
Frederic A. Besley, M.D. John C. Hollister, M. D. Cecil v. Bachellé, M. D.
Wm. R. Cubbins, M. D.

Franklin H. Martin, M. D., Managing Editor
Allen B. Kanavel, M. D., Associate Editor

COLLABORATORS

CHICAGO

Ex-Officio { Geo. W. Webster, M. D., President Chicago Medical Society
David W. Graham, M. D., President Chicago Surgical Society
Junius C. Hoag, M. D., President Chicago Gynecological Society

W. H. Allport, M. D.
Frank T. Andrews, M. D.
C. S. Bacon, M. D.
Carl Beck, M. D.
Arthur D. Bevan, M. D.
James Burry, M. D.
Henry T. Byford, M. D.
Frank Cary, M. D.
Charles Davison, M. D.
Joseph B. DeLee, M. D.
E. J. Doering, M. D.
Frank B. Earle, M. D.
Alex. H. Ferguson, M. D.
Albert Goldspohn, M. D.
David W. Graham, M. D.
A. E. Halstead, M. D.
M. L. Harris, M. D.
Wm. M. Harsha, M. D.
Fernand Henrotin, M. D.
J. C. Hoag, M. D.
Gustav Kolischer, M. D.
Henry F. Lewis, M. D.
L. L. McArthur, M. D.
Andrew McDermid, M. D.
H. P. Newman, M. D.
A. J. Ochsner, M. D.
John E. Owens, M. D.
C. E. Paddock, M. D.
S. C. Plummer, M. D.
C. B. Reed, M. D.
H. M. Richter, M. D.
S. C. Ricord, M. D.
Byron Robinson, M. D.
Wm. E. Schroeder, M. D.
E. J. Senn, M. D.
D. A. K. Steele, M. D.
Weller Van Hook, M. D.
Bertha Van Hoosen, M. D.
Lucy Waite, M. D.
T. J. Watkins, M. D.

NEW YORK

J. D. Emmett, M. D. Wm. T. Bull, M. D.
Austin Flint, Jr., M. D.

BOSTON

Maurice H. Richardson, M.D. Walter L. Burrage, M.D.
Edward Reynolds, M. D.

PHILADELPHIA

E. E. Montgomery, M. D. John B. Deaver, M. D.
Edward P. Davis, M. D.

BALTIMORE

Howard A. Kelly, M. D. J. C. Bloodgood, M. D.
J. Whitridge Williams, M. D.

SAN FRANCISCO

Beverly MacMonagle, M. D. George Goodfellow, M. D.

DENVER

W. W. Grant, M. D. Carey Fleming, M. D.

WASHINGTON

Henry D. Fry, M. D. J. Wesley Bovee, M. D.

ROCHESTER, MINN.

William J. Mayo, M. D. Charles H. Mayo, M. D.

ST. LOUIS

N. B. Carson, M. D. Walter B. Dorsett, M. D.
M. O. Boelig, M. D.

KANSAS CITY

A. H. Cordier, M. D. J. D. Griffith, M. D.

LOUISVILLE

Lewis S. McMurtry, M. D. Ap. Morgan Vance, M. D.

PUBLISHED BY THE

SURGICAL PUBLISHING COMPANY OF CHICAGO

103 STATE STREET

Entered as second-class matter June 19, 1905, at the postoffice at Chicago, Illinois, under the Act of Congress March 3d, 1897.

Copyright, 1905, by The Surgical Publishing Company of Chicago

Post-Graduate Medical School *of* Chicago

2400 DEARBORN STREET, CHICAGO

W. F. COLEMAN, M. D., *President*
ARTHUR R. ELLIOTT, M. D., *Vice-President*
W. L. BAUM, M. D., *Treasurer*
F. A. BESLEY, M. D.
FRANKLIN H. MARTIN, M. D., *Secretary*

Practical Post-Graduate Courses in All the Departments of Medicine and Surgery

FACULTY

Pathology and Bacteriology
F. R. Zeit, M. D.

Medicine
Arthur R. Elliott, A. M., M. D.
Geo. F. Butler, M. D.
H. F. Goodwin, M. D.
M. M. Portis, M. D.

Surgery
T. J. Sullivan, M. D.
Frederick A. Besley, M. D.
Wm. R. Cubbins, M. D.
A. E. Halsted, M. D.
Allen B. Kanavel, M. D.
H. M. Ritchey, M. D.

Orthopedic Surgery
Robert Hardon, M. D.

Diseases of Rectum
Stuart Johnstone, M. D.

Gynecology
Franklin H. Martin, M. D.
Albert Goldspohn, M. D.
Emil Ries, M. D.
A. McDermid, M. B., M. D.

Stomach and Intestines
Fenton B. Turck, M. D.
Milton H. Mack, M. D.
G. F. Pierce, M. D.

Ear
A. H. Andrews, M. D.

Eye
W. Franklin Coleman, M. D., M. R. C. S.
Geo. F. Baker, M. D.
Clark W. Hawley, M. D.
R. S. Pa..lto, M. D.

Nose and Throat
G. P. Head, M. D.
O. J. Stein, M. D.
James T. Campbell, M. D.

Nervous Diseases
Julius Grinker, M. D.

Obstetrics
C. E. Paddock, M. D.
A. McDermid, M. D.

Diseases of Children
J. C. Cook, M. D.
Thos. Grant Allen, M. D.
Joseph Brennemann, M. D.

Skin and Venereal Diseases
W. L. Baum, M. D.

Anatomy
Wm. R. Cubbins, M. D.

Electro-Physics
C. S. Neiswanger, M. D.

EXTRA-MURAL FACULTY

Medicine
Robert H. Babcock, M. D.
H. W. Gunlss, M. D., C. M.

Surgery
D. N. Eisendrath, M. D.
L. L. McArthur, M. D.
D. A. K. Steele, M. D.
J. B. Murphy, A. M., M. D.

Gynecology
Lester Frankenthal, M. D.
Henry T. Byford, M. D.
Henry P. Newman, M. D., A. M.

Eye
Casey A. Wood, M. D.
T. A. Woodruff, M. D.

Ear
Norval H. Pierce, M. D.
Seth Scott Bishop, M. D., LL. D

Nose and Throat
T. Melville Hardie, M. D., B. A.

Nervous Diseases
Sydney Kuh, M. D.
Richard Dewey, M. D.
Daniel R. Brower, M. D.

Skin and Venereal Diseases
L. Bolte Baldwin, M. D.

LISTERINE

The original antiseptic compound

(*Awarded Gold Medal (Highest Award) Lewis & Clark Centennial Exposition, Portland, 1905; Awarded Gold Medal (Highest Award) Louisiana Purchase Exposition, St. Louis, 1904; Awarded Bronze Medal (Highest Award) Exposition Universelle de 1900, Paris.*)

Listerine is an efficient and very effective means of conveying to the innermost recesses and folds of the mucous membranes that mild and efficient mineral antiseptic, boracic acid, which it holds in perfect solution; and whilst there is no possibility of poisonous effect through the absorption of Listerine, its power to neutralize the products of putrefaction (thus preventing septic absorption) has been most satisfactorily determined.

LISTERINE DERMATIC SOAP

A saponaceous detergent for use in the antiseptic treatment of diseases of the skin

Listerine Dermatic Soap contains the essential antiseptic constituents of eucalyptus (1%), mentha, gaultheria and thyme (each ½%), which enter into the composition of the well-known antiseptic preparation Listerine, while the quality of excellence of the soap-stock employed as the vehicle for this medication, will be readily apparent when used upon the most delicate skin, and upon the scalp. Listerine Dermatic Soap contains no animal fats, and none but the very best vegetable oils; before it is "milled" and pressed into cakes it is *super-fatted* by the addition of an emollient oil, and the smooth, elastic condition of the skin secured by using Listerine Dermatic Soap is largely due to the presence of this ingredient. Unusual care is exercised in the preparation of Listerine Dermatic Soap, and as the antiseptic constituents of Listerine are added to the soap after it has received its surplus of unsaponified emollient oil, they retain their peculiar antiseptic virtues and fragrance.

A sample of Listerine Dermatic Soap may be had upon application to the manufacturers—

Lambert Pharmacal Co., St. Louis, U. S. A.

TABLE OF CONTENTS

ORIGINAL ARTICLES

1. SENILE PARENCHYMATOUS HYPERTROPHY OF THE FEMALE BREAST—ITS RELATION TO CYST FORMATION AND CARCINOMA. *Joseph C. Bloodgood, M.D., Baltimore, Maryland* 721
2. PERIPHERAL VERSUS INTRACRANIAL OPERATIONS FOR TIC-DOULOUREUX. *C. H. Mayo, A.M., M.D., Rochester, Minnesota* 731
3. TENDON TISSUE VERSUS CATGUT LIGATURES. *Nicholas Senn, M.D., Ph.D., LL.D., Chicago* 734
4. VACCINE THERAPY AND PASSIVE HYPERÆMIA IN SURGERY. *John C. Hollister, M.D., Chicago* 740
5. THE BLOODLESS METHODS OF ARTIFICIAL DILATATION OF THE CERVIX UTERI AT FULL TERM. *Henry F. Lewis, M.D., Chicago* 756
6. BLOODY METHODS OF RAPID DILATATION. *Rudolph Wieser Holmes, M.D., Chicago* 777
7. A REVIEW OF OVER FOURTEEN THOUSAND SURGICAL ANÆSTHESIAS. *Alice Magaw, Rochester, Minnesota* 795
8. THE PLASTIC SURGERY OF THE EYELIDS BY THE USE OF PEDUNCULATED DOUBLED SKIN FLAPS. *H. Leischner, M.D., Vienna, Austria* 799

CONTENTS CONTINUED OPPOSITE NEXT PAGE

The new Pure Food and Drug Law goes into effect on January 1, next. The SQUIBB label is a guaranty of fullest compliance with the law and meets the highest requirements as to Uniformity, Purity, Efficiency, and therefore Reliability.

Respectfully suggested:
Specify SQUIBBS

The products of the
U. S. P. and N. F.
Also a line of
Medicinal Tablets

For Price List and
fullest information
address:
Department V.

E·R·SQUIBB & SONS

This CATGUT is sterilized in oil at a temperature of 320 degrees F. It is impregnated with IODINE, which renders it antiseptic and at the same time easily seen on the field of operation. It is highly elastic and almost as supple as silk, hence easily handled. Sufficient oil remains in the strand to prevent untwisting during its use—for the same reason absorption is delayed.

PLAIN, . . }
TANNED, 20 and 30 Days, } $2.50 PER DOZEN TUBES.

Sizes, 00, 0, 1, 2, 3, 4.

C. DeWITT LUKENS CO., - - - ST. LOUIS, MO., U. S. A.

TABLE OF CONTENTS—CONTINUED

DEPARTMENT OF TECHNIQUE

1. AMPUTATION OF THE CERVIX WITH THE AID OF AN INTRAUTERINE TENACULUM. *R. C. Coffey, M.D., Portland, Oregon* 804
2. TECHNIQUE OF CHICAGO LYING-IN HOSPITAL AND DISPENSARY. *Joseph B. De Lee, M.D., Chicago* 805

EDITORIALS

1. SURGERY, PAST, PRESENT, AND FUTURE. *Weller Van Hook, M.D., Chicago* 816
2. BIBLIOGRAPHIES 817

TRANSACTIONS OF SOCIETIES

CHICAGO SURGICAL SOCIETY
Extensive Carcinoma of the Face 818
Carcinoma of the Face 819
Lipomatosis of the Kidney 820
Rupture of the Kidney. Discussion 820
Comminuted Fracture of the Patella Treated by Catgut Suture 821

CHICAGO SURGICAL SOCIETY—*Continued*
Necessity of Combining with General Surgical Treatment of Infection, Vaccine Therapy and Passive Hyperæmia. Discussion 823
Parovarian Cyst Complicated by Intestinal Obstruction and Gall-stones 826

CONTENTS CONTINUED OPPOSITE NEXT PAGE

"I like the idea of the Two Irons in Hemaboloids"

was the comment of a physician, and this peculiarity is worthy of special note.

Each Tablespoonful of Hemaboloids contains as much iron as 20 minims (1.33 c.c.) Tr. Ferri Chlor.

The larger part of the iron in Hemaboloids exists in organic combination with the nucleo-proteids, obtained from vegetables rich in iron.

This vegetable food-iron is "ferrated" with a less resistant organic iron compound, to neutralize the sulphur compounds in the bowel, thus preventing the destruction and permitting the absorption of the food-iron in Hemaboloids, and that of the daily food supply.

Dose: One Tablespoonful 3 or 4 times a day.

THE PALISADE M'FG CO.
Yonkers, N. Y.

Arend's Kumyss

(The King of Foods)

Arend's Kumyss presents in a perfectly soluble and freely assimilable form all the elements that are required for the nourishment and support of the organism.

Arend's Kumyss Imparts the strength of perfect nutrition. Its use in indicated in a great variety of diseases. As a convalescent food it has no equal.

Arend's Kumyss has been prescribed and recommended by the medical profession for over thirty years.

Clinical Reports and Descriptive Literature Sent Free Upon Request

A. AREND DRUG CO.

MANUFACTURING CHEMISTS

Telephone Main 3506

Cor. 5th Avenue and Madison St. CHICAGO, ILLINOIS

The Best at One Price Only

HIGHEST GRADE SURGEONS' INSTRUMENTS, HOSPITAL FURNITURE, STERILIZING APPARATUS, SICK-ROOM UTENSILS INVALID FURNITURE, ELECTRICAL AND X-RAY APPARATUS, APPARATUS FOR VIBRATORY MASSAGE

SEND FOR CATALOGUES

W. R. GRADY CO.

45 and 47 Wabash Avenue, Chicago

TABLE OF CONTENTS — CONTINUED

TRANSACTIONS OF SOCIETIES — *Continued*

CHICAGO GYNECOLOGICAL SOCIETY

The Bloody Methods of Rapid Dilatation of the Cervix Uteri at Full Term 827

CHICAGO GYNECOLOGICAL SOCIETY — *Continued*

The Bloodless Methods of Rapid Dilatation of the Cervix Uteri. Discussion 827

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF SURGERY

Renal Tuberculosis 830

Carcinoma of the Rectum 833

Surgical Treatment of Ulcer of the Stomach 834

Gastro-mesenteric Ileus 837

The Röntgen Ray Treatment of Goiter 837

Concerning a Third Thousand Thyroid Excisions 838

Transplantation of Thyroid Tissue into the Spleen ... 838

Tuberculosis of the Mammary Gland and the Permanent Results of Operative Treatment 839

DEPARTMENT OF SURGERY — *Continued*

The Röntgen Treatment of Malignant Lymphomata and its Results 840

DEPARTMENT OF GYNECOLOGY

Urethral Bacteria as a Factor in the Ætiology of Cystitis in Women 841

Sclerotic Changes in the Uterine Vessels and the Hemorrhage of the Menopause 842

The Results of Vaginal Hysterectomy for Carcinoma. 843

BOOK REVIEWS

Surgery: Its Principles and Practice. William Williams Keen, M. D. 844

American Practice of Surgery. Edited by Joseph D. Bryant, M. D., and Albert Buck, M. D. 845

The Practice of Gynecology 846

Text-book of Medical Jurisprudence and Toxicology 847

Books Received 847

Is Lower Price a Valid Reason for Preferring Stearns' Antitoxin?

Yes: because its quality is unsurpassed and its injecting device (the Simplex Syringe) is unequaled.

The reduced price results from economy in marketing—not in preparing the serum.

This economy is effected by our having abandoned, 14 months ago, the wasteful and unnecessary practice of exchanging new for unsold serum. Now, the druggist buys Stearns' Serums outright; never returns a package to us; hence there is no waste, no overproduction, no high price to pay for that waste.

Thus, the user of Stearns' Antitoxin pays for only what he uses; the user of any other brand pays for a large proportion of wasted returned serum besides what he uses.

No one has ever presumed to question the high quality of Stearns' Antitoxin. It is prepared by scientific experts in our splendidly equipped laboratories. No precaution is neglected, no expense spared, to make it as nearly perfect a product of its kind as science and skill can produce. Hundreds of thousands of doses have been used : it is everywhere recognized as conforming to the highest standards of life-saving efficiency.

The retail price of Stearns' Diphtheric Antitoxin is $1.75 for 1000 units; $3 for 2000 units; $4 for 3000 units. That is, from 15 to 20 per cent. less than other standard brands.

Therefore you have every reason—Quality, Convenience, and Economy—for preferring Stearns' Antitoxin when buying or prescribing.

A RARE BARGAIN

(GENITO-URINARY POSITION)

Garland Surgical Operating Table

Illustration represents but one of the many radical positions, **which can be multiplied** by various combinations of the several adjustments. It is clearly ahead of all others except in high price. Combining in a surgical and gynaecological table, and adjustable top with adjustable leaves and armrest, a cabinet of drawers opening to either side, a cup-board with glass shelves, swinging glass shelves with glass trays, all finished inside with white enamel, and outside in highest piano polish finish.

Dimensions. Length, 5 feet 6 inches; width, 22 inches; height, 34 inches. Weight packed for shipment about 200 pounds.

PRICES

Best Golden Oak Polished Finish, quartered oak, full cabinet four drawers, three glass trays, nickel-plated trimmings, leather top cushions and pillow, leg- and armrests..... **$50.00**

Our 750 page Illustrated Surgical Instrument Catalog sent *Free* per *Express Prepaid* upon receipt of your request.

SHARP & SMITH

Manufacturers and Importers of

High Grade Surgical and Veterinary Instruments and Hospital Supplies

92 WABASH AVENUE **2 Doors North of Washington St.** **CHICAGO, ILL.**

Established 1844 **Incorporated 1904**

We are the LARGEST manufacturers of SURGICAL ELASTIC GOODS in the United States.

Chicago Laboratory

126 State Street, Chicago

Clinical and Analytical Analyses made in a completely equipped Laboratory, by competent men, with prompt service.

TELEPHONE CENTRAL 6239

RALPH. W. WEBSTER, M. D., PH. D., Director

MILTON WESTON HALL, M. D., Assistant Director

JAS. W. NYE, Manager

Surgery, Gynecology and Obstetrics

AN INTERNATIONAL MAGAZINE

PUBLISHED MONTHLY BY THE

SURGICAL PUBLISHING COMPANY OF CHICAGO

PUBLICATION AND EDITORIAL OFFICES

103 STATE STREET

EDITORIAL STAFF

NICHOLAS SENN, M. D.

JOHN B. MURPHY, M. D. J. CLARENCE WEBSTER, M. D. C. S. BACON, M. D.

E. WYLLYS ANDREWS, M. D. E. C. DUDLEY, M. D. RUDOLPH W. HOLMES, M. D.

FREDERIC A. BESLEY, M. D. JOHN C. HOLLISTER, M. D. CECIL V. BACHELLÉ, M. D.

WM. R. CUBBINS, M. D.

FRANKLIN H. MARTIN, M. D., Managing Editor

ALLEN B. KANAVEL, M. D., Associate Editor

SURGERY, GYNECOLOGY AND OBSTETRICS is published by the SURGICAL PUBLISHING COMPANY OF CHICAGO, a stock company incorporated under the laws of the State of Illinois and organized for the purpose of financing the magazine. The Company is capitalized for $50,000.00 all of which was made available for establishing and maintaining the enterprise and for no other purpose.

The stock holders are Chicago surgeons, all of whom are of one accord—that no legitimate expense shall be spared to make and maintain SURGERY, GYNECOLOGY AND OBSTETRICS a creditable, scientific, surgical magazine.

The stock holders are as follows:

E. Wyllys Andrews, M. D.
John B. Murphy, M. D.
Frederic A. Besley, M. D.
C. S. Bacon, M. D.
William R. Cubbins, M. D.
John C Hollister, M. D.
Allen B. Kanavel M. D.
Nicholas Senn, M. D.
J. Clarence Webster, M. D.
Albert Goldspohn, M. D.
William E. Schroeder, M. D.
Charles E. Paddock, M. D.
Franklin H. Martin, M. D.
Cecil v. Bachellé, M. D.

Pepto-Mangan ("Gude")

IS AN IDEAL FERRUGINOUS PREPARATION, Because—

1. It causes a rapid increase in the number of red blood corpuscles and the percentage of hemoglobin;
2. It does not derange the stomach in any way;
3. Far from causing anorexia, it actually increases the appetite.
4. It is palatable—a point of great importance in the treatment of women and children.
5. It does not constipate.
6. It does not affect the teeth.

IT IS THE ONLY PREPARATION OF ITS KIND, Because

1. There is no other preparation, official or non-official, which represents both iron and manganese in a neutral organic solution as true peptonates.
2. When taken into the stomach it undergoes no chemical change whatsoever and is ready for quick absorption and rapid infusion into the blood.

Therefore it clearly follows that PEPTO-MANGAN (GUDE) is of marked and certain value in all forms of

Anemia, Chlorosis, Rickets, Amenorrhea, Dysmenorrhea, Neurasthenia, Bright's Disease,

—in fact, in all cases where there is blood impoverishment from whatever cause.

To avoid the substitution of worthless products, prescribe Pepto-Mangan (Gude) in original bottles. It is never sold in bulk.

Samples and literature upon request.

M. J. BREITENBACH COMPANY.

31 New York, U. S. A.

BACTERIOLOGICAL WALL CHART FOR THE PHYSICIAN'S OFFICE.—One of our scientific and artistically produced, bacteriological charts in colors, exhibiting 60 different pathogenic micro-organisms will be mailed free to any regular medical practitioner upon request mentioning this journal. This chart has received the highest praise from leading bacteriologists and pathologists, in this and other countries not only for its scientific accuracy, but for the artistic and skillful manner in which it has been executed. It exhibits more illustrations of the different micro-organisms than can be found in any one text-book published. M. J. BREITENBACH CO., NEW YORK.

Announcement

By H. K. Mulford Company

Concerning the National Food and Drugs Law

The National Food and Drugs Law, which becomes effective January 1, 1907, requires the maintenance of the standards of the United States Pharmacopeia and the standardization of certain crude drugs and preparations thereof.

For years we have anticipated both the United States Pharmacopeia and the Food and Drugs Law, and have standardized all drugs and the preparation thereof requiring standardization in the eighth decennial revision.

In addition to those drugs the standardization of which is made obligatory, we offer a full line of standardized preparations of the following assayed drugs :

Blood Root, Buckthorn Bark, Capsicum, Cascara Sagrada, Cubeb, Digitalis, Ergot, Gelsemium, Ginger, Ignatia, Indian Cannabis, Kola, Lobelia, Mandrake, Quebracho, Rhubarb, Senna and Strophanthus.

The standardization of drugs not only requires a large force of competent chemists and a well-equipped scientific laboratory, but years of preparation and painstaking work. We cheerfully comply with the requirements of the National Law, since for years we have employed a force of scientific experts for standardization and research work.

All preparations made by the H. K. Mulford Company will conform strictly to the new National Pure Food and Drugs Law. Preparations with official names will strictly conform to the United States Pharmacopeial standards. All other preparations will conform to the standards stated in our price-list (1907 Edition)—standards established by expert chemists of high standing, and which, in the opinion of the scientific world, are most liable to be adopted by the Committee of Revision when assay methods for such drugs are incorporated in future editions of the United States Pharmacopeia.

The general management and ownership of the business of the H. K. Mulford Company are controlled by graduates of pharmacy, and we accept full responsibility for every preparation bearing our label, the following being a copy of the guaranty which will appear on all products of our laboratory :

"Guaranteed under the Food and Drugs Act, June 30, 1906. **Guaranty No. 172.**"

H. K. MULFORD COMPANY

Philadelphia, December 1, 1906

P K C

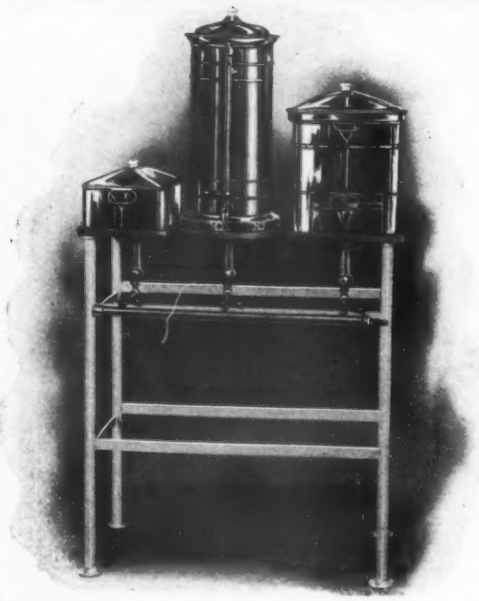
PINUS CAN. KENNEDY
WHITE AND DARK
MUCOUS ASTRINGENT

CELERINA
A NERVE STIMULANT & TONIC

ALETRIS CORDIAL RIO
UTERINE TONIC

RIO CHEMICAL CO. 56 THOMAS ST. NEW YORK

A C R



The Wisconsin

A complete plant for the perfect sterilization of dressings, water and instruments.

Scanlan Portable Sterilizer, size of sterilizing chamber, 17″x9½″x7½″.

Water sterilizer capacity, 3 gallons, equipped with lever faucet and protected water gauge.

Instrument sterilizer 17½″x7½″x4 with perforated metal tray for handling contents.

Sterilizers nickel plated; made of heavy copper; corners rounded.

Sterilizers mounted on white enamel tubular stand with cast top eliminating all crevices and square corners; fitted with special blue flame burners either gas or gasoline as ordered.

Price $50.00

Scanlan-Morris Company
Manufacturers of Hospital Furniture and Sterilizing Apparatus
Madison - - Wisconsin
"The White Line"

Malt Marrow
Mc. Avoy .. Brewing .. Co.
Chicago U.S.A.
Telephone Calumet 1064

DEPRAVED CONDITIONS

of general nutrition, or impoverishment of the blood in Scrofulous, Syphilitic or Carcinomatous patients yield promptly to the action of

A PREPARATION OF THE TRUE ACTIVE CONSTITUENTS OF COD LIVER OIL WITH HYPOPHOSPHITES OF LIME AND SODA

FORMULA.—Each fluid ounce represents 33 per cent. pure Norwegian Cod Liver Oil with six grains Calcium Hypophosphite, three grains Sodium Hypophosphite and Aromatics.

Dispensed in 16-oz. bottles only.

KATHARMON CHEMICAL COMPANY,

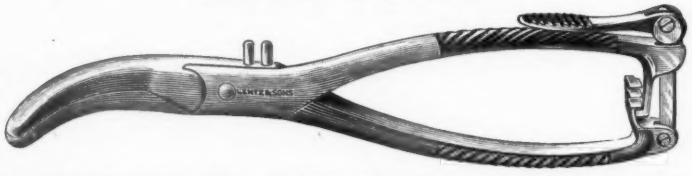
ST. LOUIS, MO.

The Coming Method in Surgery

SURGERY WITHOUT LIGATURES

DOWNES' ELECTRO-THERMIC ANGIOTRIBE

Hæmostasis by Pressure and Heat



Four Styles of Forceps, three straight blades, ¼, ⅜, and ½ inch wide, and curved blade ⅜ inch wide.

Over 1000 major abdominal operations performed without secondary hemorrhage.

Over 100 leading American surgeons are now using them. WRITE FOR REPRINTS AND CIRCULARS.

See Dr. Werder's article on Hæmostasis in the January, 1907, issue of SURGERY, GYNECOLOGY and OBSTETRICS

CHARLES LENTZ & SONS

Manufacturers of Surgical Instruments

18 and 20 North Eleventh St. PHILADELPHIA, PENN.

Bowman Dairy Company

Milk bottled in the country

PURE, CLEAN, NATURAL MILK from healthy cows fed on proper food only, produced, bottled and sealed in the country, under the most favorable conditions. Placed in the hands of the consumer in original packages.

Do our wagons serve you?
Milk, Cream, Butter, Buttermilk.
Why not buy the best?

Head Office
169-173 Ontario Street
Telephones at all division offices

Evanston Chicago Oak Park

BORDEN'S

The Genuine

MALTED MILK

THE FOOD FOR

TYPHOIDS

Samples free to those sending professional card.

Borden's Condensed Milk Co.

New York.

Largest Manufacturers of Milk Products in the World.

POLK'S
Medical Register
and Directory of North America

ESTABLISHED 1886

Do Not Be Deceived By Imitators

See that the name R. L. POLK & CO. IS ON THE ORDER BEFORE YOU SIGN IT

POLK'S is the only complete Medical Directory.

POLK'S is the only Medical Directory having an official record of all Graduates of the North American Medical Colleges for use in its compilation.

POLK'S has stood the crucial test of criticism with increasing popularity. It thoroughly covers the field.

For Descriptive Circulars, Address,

R. L. POLK & CO., Publishers

DETROIT. - MICHIGAN

K&O DOUCHE FOR THE APPLICATION OF GLYCO-THYMOLINE TO THE NASAL CAVITIES

GLYCO-THYMOLINE

FOR

CATARRHAL CONDITIONS

Nasal, Throat

Intestinal

Stomach, Rectal

and Utero-Vaginal

KRESS & OWEN COMPANY

210 FULTON STREET NEW YORK

Irregularities of the menstrual flow are, as a rule, the first manifestation of structural or other impairments of the reproductive organs. Those agents which restore the monthly visitations to normal limits, will, if properly proportioned and timely administered, exercise a curative influence upon the entire reproductive system.

DYSMENORRHEA

whether neuralgic, membranous, congestive, inflammatory, ovarian or obstructive in character, yields readily to the pain-relieving and flow-augmenting action of

Ergoapiol (Smith)

if one to two capsules are administered three times daily before and during the menstrual period.

AMENORRHEA

when due to sudden exposure to cold, mental shock, change of climate, etc., may be promptly relieved by the administration of

Ergoapiol (Smith)

in doses of two capsules three or four times daily for a few days in advance of the visitation, then giving one capsule three times a day until menstruation has ceased.

MENORRHAGIA

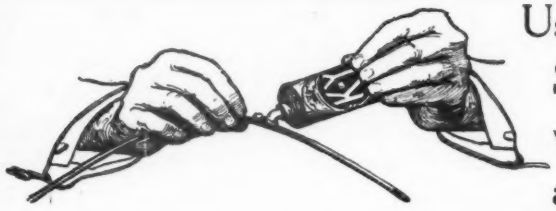
whatever may be the exciting cause, excessive menstruation may be controlled, and the uterus invigorated and toned by the administration of

Ergoapiol (Smith)

in doses of one capsule once daily for a few days in advance of the visitation, then increasing the dose to one capsule four times daily throughout the period.

This product is supplied in metal boxes containing twenty capsules. It is obtainable of all prescriptionists. Samples and literature will be sent, post paid, to physicians upon request.

Martin H. Smith Company,
NEW YORK, U. S. A.



Users of Catheters, Sounds or Specula will find "K-Y" an ideal lubricant.

It will eliminate much of the discomfort usually attendant.

"K-Y" lubricating jelly is of vegetable composition and contains enough antiseptics of the thymol class to preserve it without irritating the membranes.

"K-Y" lubricating jelly is put up in collapsible tubes so that little or much may be used without exposing the remainder to contamination.

"K-Y" lubricating jelly is an ideal lubricant, non-greasy, antiseptic, non-irritating, soluble in water, and thin enough to be applied easily to the instrument.

A sample tube will be sent upon request.

VAN HORN & SAWTELL

LONDON, ENGLAND
31-33 High Holborn

NEW YORK, U. S. A.
20 East 42nd Street

In substitute feeding of infants **food value** is a most important consideration. The "vital element" is produced by the elaboration of food having the proper and uniform consistency. Children who do not show vitality are poorly nourished. Dairy milk is seldom uniform in composition and it is difficult to secure an approximately uniform average up to the minimum requirements.

Highland Evaporated Milk offers the following uniform analysis:

Water	Fat	Milk Sugar	Protein	Ash
68.75	8.75	11.85	9	1.65

It is simply full-cream cow's milk obtained from many herds and is of uniform and excellent composition. It is reduced in volume nearly two and one-half times through a peculiar sterilizing process. This is based on scientific principles and is safe, exact and beneficial to the digestibility of the protein. Sufficient quantity for clinical tests sent on request.

HELVETIA MILK CONDENSING CO., Highland, Ill.

Atonic Indigestion

A large proportion of all cases of indigestion are the result of atony of the stomach and intestinal walls.

Gray's Glycerine Tonic

has a unique value in this particular condition as it rapidly **restores muscular vigor, increases secretory activity** and **checks fermentation.** As a consequence **the results are permanent—not transitory.**

The Purdue Frederick Co.,
298 Broadway, New York.

BROMIDIA

EVERY FLUID DRACHM CONTAINS FIFTEEN GRAINS EACH OF PURE CHLORAL HYDRATE AND PURIFIED BROM. POT.; AND ONE-EIGHTH GRAIN EACH OF GEN. IMP. EX. CANNABIS IND. AND HYOSCYAM.—IS THE ONLY HYPNOTIC THAT HAS STOOD THE TEST, AS A HYPNOTIC, FOR THIRTY YEARS IN EVERY COUNTRY IN THE WORLD.

ECTHOL IODIA PAPINE

BATTLE & CO., CHEMISTS CORPORATION, ST. LOUIS, MO., U. S. A.

BOVININE

Rich in Assimilable Organic Iron

THE profession is sadly in need of a blood reconstructant that contains every element of nutrition of the animal, mineral and vegetable kingdoms, together with an organic iron.

BOVININE contains all of this. BOVININE requires little or no digestion, being ready for immediate absorption. BOVININE is thoroughly sterile, and under its tonic and food effects the blood corpuscles and hæmaglobin rapidly increase. Herein lies its great superiority over any and all the preparations of inorganic iron and prepared foods.

THE BOVININE COMPANY
75 West Houston St., New York City

Its formula is published.
It is strictly ethical.
It is scientifically prepared.

1

Do You Dictate Letters?

IF SO USE A GRAPHOPHONE
Saves Time, Money and Worry

The Graphophone is always at hand, night or day, to receive your dictation.

Call or write for Catalogue

Columbia Phonograph Co.
Phone Central 2439
88 Wabash Ave. **CHICAGO, ILL.**

SURGEONS HAVE FOUND THAT

Eczema of the Hands

Due to frequent immersion in

MERCURIC CHLORID Solutions

may be promptly relieved by the application of

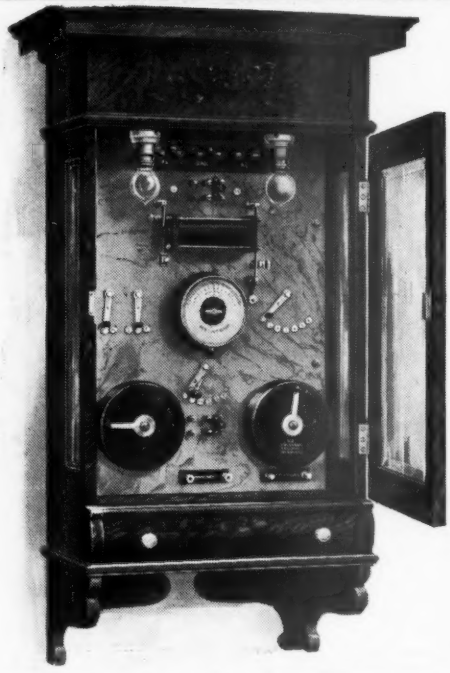
EUSOMA (Echinacea Compound)

Each fluid dram of which contains:

Echinacea	15 grains
Thuja	2 grains
Baptisia	4 grains
Boric Acid	1 grain
Alcohol	63 per cent

Sample and descriptive matter upon request.

The Eusoma Pharmaceutical Co.
CINCINNATI, OHIO



The Finishing Touches

that go toward perfection—the elaboration of the most minute detail—contrive to make

The McIntosh

Therapeutic Wall Cabinet No. 9

an apparatus of superior merit.

Its Points of Especial Advantage are a High Tension Faradic Coil, the McIntosh Monomotive Rheotome, a Special Cautery Circuit, a Current Combiner Switch, and our New Energy Changing Switch, as well as the approved MacLagan Wire Rheostat and the accurate McIntosh Shunt Milliamperemeter, as furnished with our more simple plates.

The Modalities Available include a wide range of Galvanic, Interrupted Galvanic, Galvano-Faradic, High-Tension Faradic, Cautery, Sinusoidal, and Diagnostic Lamp Currents.

The Source of Energy may be a lighting current of any voltage, direct or alternating, or a battery of iquid or dry cells.

Priced at a Popular Figure

Our New Illustrated Catalogue, Series P, 27th Edition, shows a full line of Wall Cabinets, Portable Batteries, Electrodes, Cautery Appliances, Sinusoidal Apparatus, Static Machines, X-Ray and High-Frequency Equipments. Mailed upon request. Our goods represent the highest standard of excellence in artistic design, correct workmanship and therapeutic adaptability, and will satisfy the most critical eye.

McIntosh Battery & Optical Co.

4-6 North Canal Street

Chicago . . . Illinois.

PEACOCK'S BROMIDES

½ lb. bottles only.

The Best Form of Bromides

This preparation has stood the test of clinical trial and chemical analysis.

Being absolutely uniform in purity and therapeutic strength, it can be relied upon to give clinical results which cannot be obtained from its cheaper substitutes or the commercial salts.

In Epilepsy and all cases demanding continued bromide treatment, its use *insures* minimum danger of bromism or nausea.

Each fluid drachm contains 15 grains of the neutral and pure bromides of Potassium, Sodium, Ammonium, Calcium and Lithium.

DOSE—One to three teaspoonfuls according to the amount of Bromides desired.

Free samples to the profession upon request.

Peacock Chemical Co. St. Louis, Mo.

Pharmaceutical Chemists.

CHIONIA

½ lb. bottles only.

The Ideal Hepatic Stimulant

Chionia is a palatable preparation of Chionanthus Virginica, from which the inert and objectionable features of that drug have been eliminated.

For the past twenty years this preparation has gained and maintained its reputation as an hepatic stimulant of exceptional value to the physician.

Being a gentle but positive stimulant to the hepatic functions it is particularly effectual in the treatment of Biliousness, Jaundice, Constipation and all conditions caused by hepatic torpor.

DOSE—One to two teaspoonfuls three times a day.

Free samples to the profession upon request.

Peacock Chemical Co. St. Louis, Mo.

Pharmaceutical Chemists.

Therapogen

The One Antiseptic that meets every requirement of the Surgeon

A POWERFUL GERMICIDE
A STRONG DISINFECTANT
AN EFFICIENT DEODORANT
ABSOLUTELY NON-POISONOUS

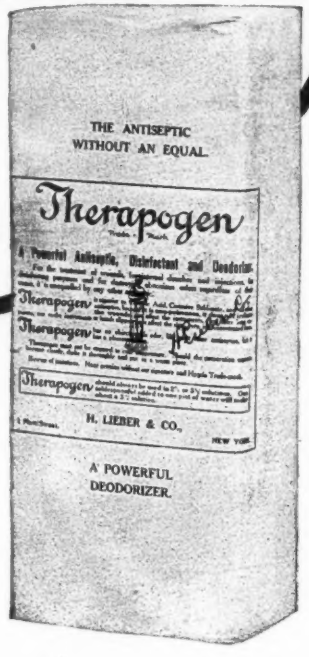
PLEASANT IN ODOR
ABSOLUTELY NON-IRRITATING
PERFECTLY SOLUBLE
REASONABLE IN PRICE

Does not irritate the most delicate skin, and has a remarkable soothing influence on inflammatory processes.

Of unequalled value in cleansing all **wounds, ulcers, sores,** and **inflammations of the mucous membranes** throughout the body; as a douche in **vaginitis, leucorrhea, after pregnancy,** in **otitis media, otorrhea,** and in **inflammatory conditions of the urinary tract;** for **deodorizing** and **disinfecting** all noxious or infectious **excreta** in the sickroom and wherever efficient antiseptic action is needed.

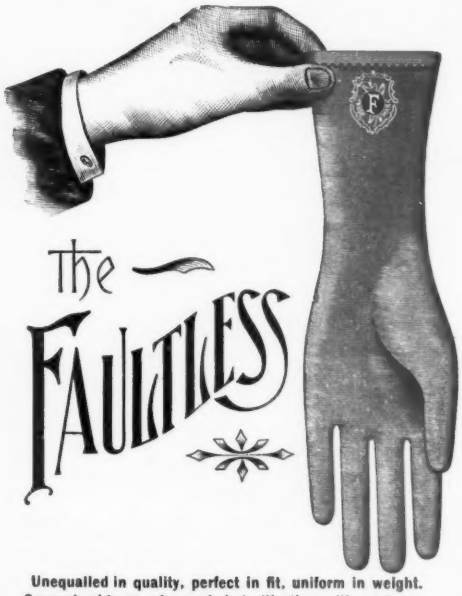
For literature and liberal samples address:

H. LIEBER & CO.
1 Platt Street
New York City



DR. RUSTERHOLZ of Zurich, writes:

"The results of my investigations with **'Therapogen'** have been satisfactory in every respect, so that the preparation may be conscientiously recommended."



Unequalled in quality, perfect in fit, uniform in weight.
Guaranteed to stand repeated sterilization without injury.

The Faultless Rubber Co.

AKRON, OHIO, U. S. A.

MANUFACTURERS OF

Surgical Rubber Goods and Hospital Supplies

Rubber Gloves, Finger Cots, Catheters, Colon and Rectal Tubes, Stomach Tubes Ice Bags, Ice and Water Caps, Urinals, Invalid Rings, Cautery Bulbs, Air Pillows, Syringes, Water Bottles, Tubings, Hospital Sheetings, Hospital Blankets, Surgical Specialties, etc.

Our many friends among the Surgical Profession are unanimous in the declaration that the Faultless Surgical Rubber Gloves are incomparably the most satisfactory ever produced.

A SUCCEDANEUM FOR MORPHIA.

Antikamnia

OPPOSED TO PAIN.

GUARANTEED!

THE new Pure Food and Drugs Act requires all manufacturers to sell their products under a guaranty, and a general guaranty should be filed in the office of the Secretary of Agriculture at Washington.

The following is a copy of a letter issued from the Department of Agriculture to us:

DEPARTMENT OF AGRICULTURE
Office of the Secretary
WASHINGTON

November 1, 1906.

The Antikamnia Chemical Company,
St. Louis, Mo.

Gentlemen:—

Your guarantee as to the character of the materials manufactured and sold by you, given in accordance with Circular 21 of this office, has been received, found to be in proper form and is regularly filed. The serial number attached thereto is No. 10.

Respectfully,
W. M. HAYS, Act. Sec'y.

All Antikamnia Preparations are sold under this guaranty and our Serial No. 10 appears on every package sold under the new law, thus assuring the medical profession of the absolute reliability of these pharmaceuticals.

THE ANTIKAMNIA CHEMICAL CO., ST. LOUIS, MO., U. S. A.

VALUABLE PRODUCTS

DIOVIBURNIA

The Most Efficient Uterine Tonic, Antispasmodic, Alterative and Anodyne.

Unexcelled in Dysmenorrhea, Menorrhagia, Threatened Abortion and wherever a uterine tonic is indicated.

NEUROSINE

The Reliable Neurotic Anodyne and Hypnotic.

The remedy par excellence in Insomnia and restlessness of Fevers, producing Natural Sleep. Almost a specific in Epilepsy.

Contains no opium, morphine, chloral or other deleterious drugs.

VALUABLE COMBINATION

One part Neurosine, to two parts Dioviburnia in Female Neuroses, Eclampsia, Melancholy, Neuralgia, Anemic Nervousness, etc.

Germiletum

OPPOSED TO GERM LIFE

A Perfect Antiseptic Germicide and Deodorant.

Non-Toxic, Non-Poisonous, Non-Irritating, slightly alkaline. NO ACID REACTION. ALMOST A SPECIFIC IN CATARRH AND ECZEMA.

FREE.—Buchanan's book, "Antisepsis and Antiseptics," 352 pp., FULL SIZE bottles of DIOVIBURNIA, NEUROSINE and GERMILETUM, LITERATURE with FORMULA furnished free to Physicians, they paying express charges.

DIOS CHEMICAL CO., ST. LOUIS, MO.

A NURSE'S OUTFIT

THE TAYLOR WOOLFENDEN CO.

WOODWARD AVE. & STATE ST.

DETROIT, MICH.

MAIL ORDER DEPT.

PRICES

DRESS GINGHAM (SIZES 34 TO 44)	2.25
KERCHIEF	.35
CAP	.35
COLLAR (STRAIGHT BAND)	.15
COLLAR (TURNOVER)	.20
CUFFS PER PAIR	.25
APRONS (WITHOUT BIBS)	.75
APRONS (WITH BIBS)	.75 .100 1.50

THIS is what a Magazine looks like when bound in a

SIMPLEX BINDER

We make covers of all sizes and Print titles to suit.

You can bind your valuable papers, books, magazines or sheet music at Home.

The Simplex Adjustable Binder holds one or more issues and becomes a permanently bound book when the volume is completed.

Write for catalogue and price list.

SIMPLEX BINDER CO.

511-513 W. 69th St. CHICAGO, ILL.

The Surgeons' Ideal Head Lamp

Perfect, Even, White Light, 32 C. P., 110 Volts, 9 Foot Cord with Stage Connector, Unbreakable Plug, Double Universal Joint. **Price $7.50.**

THE WM. MEYER CO.
Electrical Engineers
56 Fifth Avenue, Chicago

CACTINA PILLETS

A Safe Cardiac Tonic Stimulant

In cardiac and general muscular relaxation due to functional cardiac and circulatory disturbances "Cactina Pillets" has many advantages over other and older heart stimulants.

As it has no cumulative action, it can be given freely during the treatment of febrile or chronic diseases and in all cases where it is necessary to employ a heart sustainer; or when it is desired to improve foetal circulation during gestation.

Each pillet represents one one-hundredth of a grain of Cactina, the active proximate principle of Cereus Grandiflora (Mexicana).

DOSE—One to three Pillets three or four times a day.

Free samples to Physicans upon request.

SULTAN DRUG CO. ST. LOUIS, MO.
Pharmaceutical Chemists.

SENG

The Digestive Secernent

A preparation of Panax (Ginseng) in an aromatic vehicle.

The therapeutic action of Seng is that of a stimulant to the secretory glands of the entire alimentary canal.

In those conditions resulting in *malnutrition* due to a lack of the digestive fluids, its employment will encourage a return to normal alimentary functionation.

Thus it is valuable in some forms of *dyspepsia* and wasting diseases.

DOSE—One or two teaspoonfuls three or more times a day.

PUT UP IN 10 OZ. BOTTLES ONLY.

Free samples to Physicians upon request.

SULTAN DRUG CO. ST. LOUIS, MO.
Pharmaceutical Chemists.

OUR PACKAGE

The serum syringe container which we are now supplying meets the demands of the medical profession more fully than any similar device of which we have knowledge. It is hermetically glass-sealed at both ends—no rubber stoppers are used. The needle forms a firm connection with the glass by means of a metal collar externally threaded. It is sterilized before packing. A flexible rubber connection is supplied with each container. Our serum package combines safety and convenience in the highest degree.

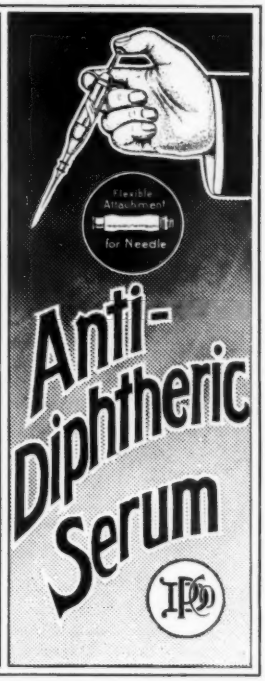
A RELIABLE ANTITOXIN

Our Antidiphtheric Serum is accurately standardized, elaborate physiologic tests being employed to determine its potency and uniformity. Its purity is assured by our scientific methods of manufacture (indeed, it would be difficult to imagine a safeguard which we do not apply). Absence of pathogenic bacteria is further established by careful bacteriologic examinations of the finished serum before it leaves the laboratory.

Bulbs of 500, 1000, 2000, 3000 and 4000 units.

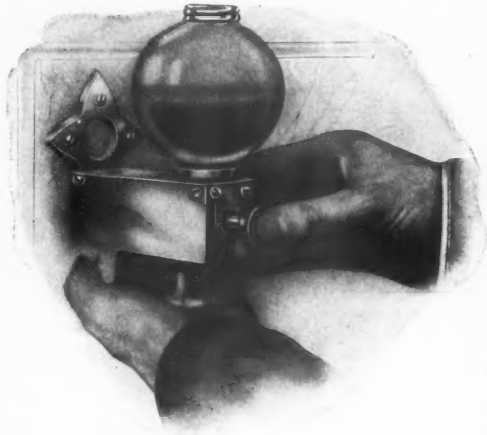
WE ACCEPT OLD STOCK IN EXCHANGE FOR FRESH SERUM

PARKE, DAVIS & COMPANY
HOME OFFICES AND LABORATORIES
DETROIT, MICH., U. S. A.



DR. PARKER'S LIQUID SOAP DISPENSER

THIS Dispenser has the indorsement of the medical profession. It is thoroughly Hygienic in construction and Sanitary in operation, dispensing a measured quantity of liquid soap at each operation. It is built upon scientific lines. Glass and steel enter into its construction, and the metal parts are nickel-plated, thus making a neat and attractive fixture for the office.



In physicians' offices and hospital dressing rooms, the dispenser is operated by hand, simply push the button. In the operating room it is operated by a foot pedal, thus the surgeon has no occasion to use his hands in getting soap.

The following is a partial list of Chicago Hospitals where this dispenser is used in the operating and dressing rooms.

Presbyterian	Mercy	Michael Reese
St. Luke's	Wesley	West Side
Provident	Policlinic	Lincoln Park

The Woman's Post Graduate School and Hospital, and the private offices of the leading physicians and surgeons.

C. Wickham Parker, M. D.
70 State Street :: :: Chicago, Illinois

THIS IS NOT A LARGE COIL BUT IS SUPERIOR TO ANY X-RAY INSTRUMENT ON THE MARKET FOR THE PRICE

X-RAY COIL

THE WORLD'S STANDARD

TAKE NOTICE

A COMPLETE ALTERNATING CURRENT X-RAY COIL EQUIPMENT AS ILLUSTRATED $175.00

Same Style for Direct Current . $150.00

Remember though our Products are of the Highest Scientific Value, they are not high in price . . . . . .

Before placing your order, send for our latest catalogue and price list . . . . .

W. SCHEIDEL COIL CO.

171 EAST RANDOLPH STREET, CHICAGO, U. S. A.

ADOLPH GEHRMANN, M. D. W. A. EVANS, M. D.

JOHN C. WESENER, PH. C., M. D.

THE COLUMBUS MEDICAL LABORATORY

A laboratory for physicians. Chemical, microscopical, and bacteriologic examinations. Culture media supplied. Investigation of sanitary and medico-legal questions. Instructions given in laboratory medicine. Disinfection of houses and apartments. Circulars and Fee Table on application.

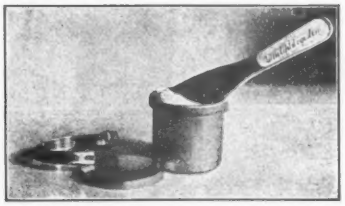
COLUMBUS MEDICAL LABORATORY

TELEPHONE CENTRAL-2740

103 STATE STREET, CHICAGO

Antiphlogistine

(Inflammation's Antidote)



THE SPATULA

Oftentimes will make unnecessary

THE SCALPEL

If it be used for the application of Antiphlogistine hot and thick in the various inflammatory and congestive conditions.

ANTIPHLOGISTINE

Depletes Inflamed Areas. Flushes the Capillaries. Stimulates the Reflexes. Restores the Circulation. Bleeds but Saves the Blood.

THE DENVER CHEMICAL MFG. CO.

Chicago Denver San Francisco **NEW YORK** London Sydney Montreal

MALPRACTICE SUITS

are annoying and expensive to defend. A competent and successful defense was difficult to secure before the organization of the Physicians Defense Company of Fort Wayne, Indiana. Now medical practitioners holding *Physicians Defense Contracts* are assured that a verdict will be rendered in their favor, vindicating their diagnosis, treatment, and work, without annoyance, loss of time, or expense.

$10,000 Defense	::	**$15.00 per annum**
5,000 Defense	::	**10.00 per annum**

FULL INFORMATION BY MAIL

PHYSICIANS DEFENSE COMPANY

Fort Wayne, Indiana

The only company authorized by Statute or Charter to defend Physicians, Surgeons, and Dentists.

THE CHICAGO HOSPITAL

Telephones { Local, Oakland 439 / Long Distance, Oakland 1466

452 E. Forty-ninth Street

A PRIVATE HOSPITAL

(Incorporated 1896 and Reorganized 1905)

STAFF

Surgeons and Gynecologists

Alexander Hugh Ferguson, M. D.
J. G. Craig, M. D.
Andrew McDermid, M. D.
Albert Peacock, M. D.
Victor S. Frankenstein, M. D.
Wm. M. Harsha, M. D.
John A. Lyons, M. D.

Ophthalmologist

Casey A. Wood, M. D.

Diseases of Children

John C. Cook, M. D.

Physicians

Wm. E. Quine, M. D.
B. L. Riese, M. D.
H. W. Gentles, M. D.

Situated in the finest resident district in Chicago, overlooking Drexel Boulevared and one block from the famous South-side drives. It is modern, fire-proof in construction, elegantly furnished, efficiently quipped, and in brief the best and most high classed in America. It is reached by Cottage Grove Avenue Cars, Elevated and Illinois Central R. R.

Rooms with open fire-places; all outside and single.

Rates vary from fifteen ($15.00) to fifty ($50.00) per week.

X-Ray machines for Flouroscopic examinations and Skiagraphic work. High frequency equipment.

Patients admitted suffering from *Surgical*, *Medical*, Gynecological, Orthopedic, and Ophthalmic diseases. Contagious, Mental, and Alcoholic cases are not received.

Service day and night, trained nurses, private ambulance. The hospital is open to reputable physicians.

Communications addressed to **The SUPERINTENDENT and MANAGER,** Cor. 49th and Cottage Grove Ave.

PALMYRA SPRINGS SANITARIUM

FOR THE SCIENTIFIC CARE AND TREATMENT OF

Male Patients Not Accepted

Inspection Invited

Home-like, quiet retreat. Beautifully located in our private 40 acre grove. Easily accessible to all points. All the latest appliances for the administration of Hydrotherapy, Electricity, Massage, Etc.

Mental and Nervous Diseases of Women

C. HOWARD SEARLE, M. D., Superintendent

CONSULTATION STAFF

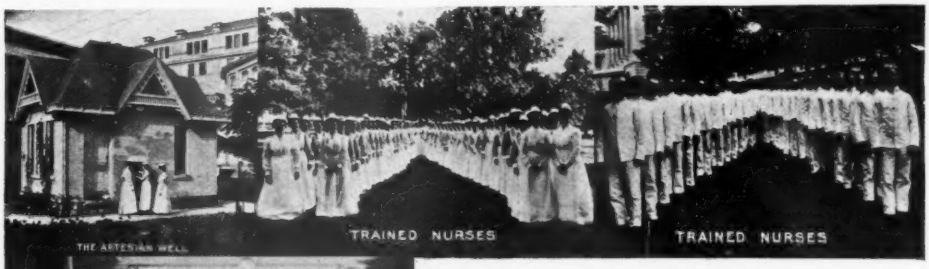
Daniel R. Brower, M. D., 34 Washington St., Chicago
Sydney Kuh, M. D., 103 State St., Chicago
J. E. Kiernan, M. D., 103 State St., Chicago
C. H. Hughes, M. D., 3872 Washington Blvd., St. Louis

For Further Information, Address

PALMYRA SPRINGS SANITARIUM, PALMYRA, WIS.

We Have a Woman Physician on Medical Staff

"LONG DISTANCE TELEPHONE IN SANITARIUM"



MIDWINTER

At Battle Creek

THE absorbing outdoor life; the sun parlors, spacious lobbies, tropical covered gardens and inviting foyers; the rest hours; the baths; skilled attendants and trained nurses; the chef with his delicious dietetic food calories; the fascinating dining room overlooking fifty miles of the "Picturesque Peninsular;" the gymnasium and swimming pools, with instructors; the medical and surgical equipment with thirty attending physicians; the body culture, massage, Swedish and vibration movements; the pure water, the open air treatment, the entertaining guests; the never-tiring educational, religious and amusement features; the spirit of good cheer and hopefulness that pervades everything.

All these, at The Sanitarium, constitutes what has been called a great University of Health, to teach and illustrate the principles of right living, to assist invalids and the physically inefficient in lifting themselves up to normal activity and enjoyment; to correct false habits and teach true food values and to demonstrate that health, like disease, comes gradually by processes of growth and change.

Winter is the best season to secure quick and lasting results at the Sanitarium. Plenty of indoor and outdoor entertainment—sleighing, skating, skeeing, tobogganing. Rates vary to meet practically all conditions.

A Book of Views, containing handsome illustrations and interesting description of The Sanitarium, will be mailed free upon request. Write for it. Address, Box 11.

The Sanitarium, Battle Creek, Mich.

College of Physicians and Surgeons

Of Chicago

College of Medicine of the University of Illinois

The College of Physicians and Surgeons has unsurpassed facilities and equipment.

New Building of College

Situated in the heart of one of the greatest medical centers of the world, it affords clinical advantages to students which are unexcelled.

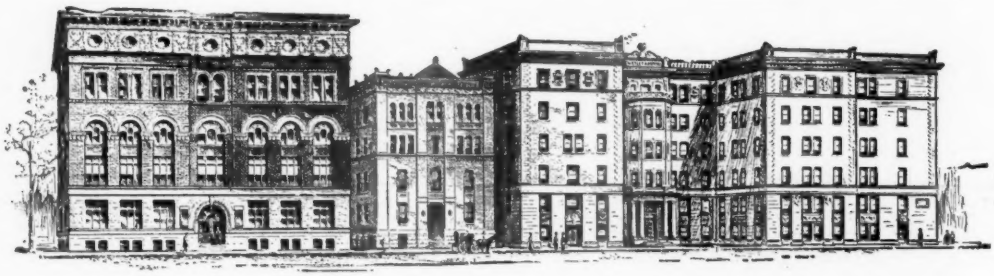
Collegiate year September 26th, 1905, to June 5th, 1906

Recently acquired additional space makes possible magnificent laboratories, amphitheaters, lecture rooms and library. Persons interested in medical education are invited to investigate this school.

ADDRESS

DR. FRANK B. EARLE, Secretary

CONGRESS AND HONORE STS., CHICAGO



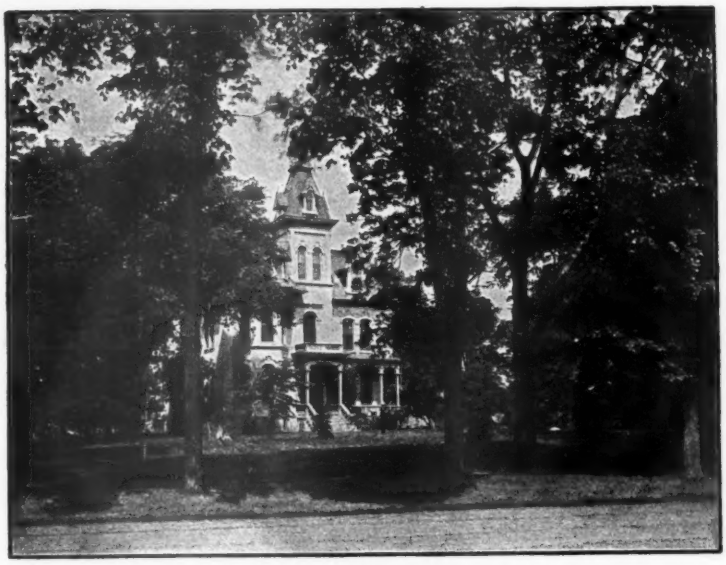
NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

(Chicago Medical College)

N. S. DAVIS, A. M., M. D., DEAN

Buildings and equipment new. Four Hospitals in Affiliation, with 800 beds. Clinical work in every year. Ward walks for seniors daily. Dispensary treats 50,000 patients annually. The recognized leader in medical education. For circular and information, address,

2431 Dearborn St. DR. C. L. MIX, Secretary Chicago, Illinois



DR. BROUGHTON'S SANITARIUM for opium and other drug addictions, including alcohol and special nervous cases.
PHONE 536 **Address: R. BROUGHTON, M. D., 2007 S. Main Street, Rockford, Ill.**

KENILWORTH SANITARIUM

Kenilworth, Illinois

(C. & N. W. RAILWAY, SIX MILES NORTH OF CHICAGO)

Telephones—Kenilworth 78, Evanston 778

Built and equipped for the treatment of nervous and mental diseases. Approved diagnostic and therapeutic methods. Special system of ventilation. Rooms impervious to noise. Elegant appointments, Bath rooms en suite, steam heating, electric lighting, electric elevator.

SANGER BROWN, Physician in Charge

100 State Street, Chicago Telephone Central 3707

Have You Any Cases of Spinal Trouble?

Our Appliance No. 1 has all the essential features of a perfect spinal support.
Made for all forms of spinal deflection and irritable Spine.
It gives an even continuous support. Average weight 16 oz.
Is cool, comfortable, durable, pliable and capable of easy, accurate adjustment.
No inconvenience in wearing. Not noticeable under the clothing. The muscles are allowed free action and never become atrophied by disuse. Its elasticity and ease of adjustment permit full growth and development.
In use by men, women and children of all ages.
Endorsed by eminent medical authorities. You can safely recommend it.
Each Appliance made in exact compliance with individual measurements.
Our catalogue and other literature will be gladly sent to any regular Physician.

PHILO BURT MFG. CO.,
148, 24rd Street. Jamestown, N. Y.

CAMPHO-PHÉNIQUE

LIQUID

Acknowledged Superior in the Field of Antiseptics For Cases of Minor and Major Surgery

A Facsimile of the 25c Bottle

LIQUID IN 25c AND $1.00 CONTAINERS

POWDER

The Premier Dry Dressing For Cuts, Burns, Ulcers and all Superficial Wounds

POWDER IN 1-OZ. AND 1-LB. CONTAINERS

If You Want the Best Results

Use

SCROFONOL

For Eczema and all Skin Diseases

Samples and Literature
Both for Scrofonol and Campho-Phénique on request

CAMPHO-PHÉNIQUE CO., ST. LOUIS, MO.

SYR. HYPOPHOS. CO., FELLOWS

Contains the Essential Elements of the Animal Organization—Potash and Lime;

The Oxidising Agents—Iron and Manganese;

The Tonics—Quinine and Strychnine; (each fluid drachm contains the equivalent of 1-64th grain of pure Strychnine.)

And the Vitalizing Constituent—Phosphorus; the whole combined in the form of a syrup with a Slightly Alkaline Reaction.

It Differs in its Effects from all Analogous Preparations; and it possesses the important properties of being pleasant to the taste, easily borne by the stomach, and harmless under prolonged use.

It has Gained a Wide Reputation, particularly in the treatment of Chronic Bronchitis, and other affections of the respiratory organs. It has also been employed with much success in various nervous and debilitating diseases.

Its Curative Power is largely attributable to its stimulant, tonic, and nutritive properties, by means of which the energy of the system is recruited.

Its Action is Prompt; it stimulates the appetite and the digestion, it promotes assimilation and it enters directly into the circulation with the food products.

The prescribed dose produces a feeling of buoyancy, and removes depression and melancholy; hence the preparation is of great value in the treatment of mental and nervous affections. From the fact, also, that it exerts a tonic influence, and induces a healthy flow of the secretions, its use is indicated in a wide range of diseases.

This preparation can be procured at all chemists and druggists, everywhere.

SULPHO LYTHIN

RE: HEPATIC TORPOR.

DEAR DOCTOR: May we send you—free of any expense—a sample, with literature, bearing upon Sulpho-Lythin?

SULPHO-LYTHIN

Is a TRUE HEPATIC STIMULANT, INTESTINAL ANTISEPTIC, ANTIZYMOTIC and TOXINE ELIMINANT. An efficient substitute for CALOMEL, as attested by numerous medical authorities, and may be administered continuously without irritation or injury. We shall be pleased to hear from you.

LAINE CHEMICAL CO., MANF'G CHEMISTS 81-83 Fulton St., NEW YORK CITY

SULPHO LYTHIN

KAZOL, *Semi-Digested Milk Food*

Is a perfect nutrient and acceptable to the most delicate stomachs.

DELIVERED DIRECT

79 Dearborn Ave. MATZOON COMPANY CHICAGO, ILL.

Long Distance Phone, North-328

SEPTEMBER 1906 IS OUT OF PRINT

We will pay thirty-five cents per copy for clean copies of this issue, returned to our office postpaid. :: :: :: ::

FRANKLIN H. MARTIN, M. D.
MANAGING EDITOR
103 STATE ST., CHICAGO, ILL.

SAL HEPATICA

The original effervescing Saline Laxative and Uric Acid Solvent. A combination of the Tonic, Alterative and Laxative Salts similar to the celebrated Bitter Waters of Europe, fortified by addition of Lithium and Sodium Phosphates. It stimulates liver, tones intestinal glands, purifies alimentary tract, improves digestion, assimilation and metabolism. Especially valuable in rheumatism, gout, bilious attacks, constipation. Most efficient in eliminating toxic products from intestinal tract or blood, and correcting vicious or impaired function.

Write for free samples.

BRISTOL-MYERS CO., Brooklyn, New York

Painless Surgery and Obstetric Practice

**without chloroform or ether,
and without nausea or shock**

No Anesthetist, No Anesthetic Expense

This is not a visionary fanatical claim, but a demonstrable fact now proven at the hands of hundreds of able observers in thousands of cases, both major surgical (not minor, sleep unnecessarily prolonged and profound) and obstetrical, without one untoward result as yet reported. Dr. Emory Lanphear, of St. Louis, has alone made over 300 major operations of all kinds with every patient fast and quietly asleep. Other prominent surgeons and obstetricians also report equally good results.

Here is the Formula

Pure, Atroscine free, Hydroscine Hydrobromide	gr—1-100
Pure, Thebaine free, Morphine Sulphate (more quickly soluble than the "hydrochloride")	gr—1-4
Cactin, A. A. Co. (Concentration from Cactus Grandiflora)	gr—1-67

To any surgeon or obstetrician interested, we will send literature with full particulars of technique (the very simplest), case reports, and samples, on request. We shall appreciate an order, stamps,(or other convenient remittance form) accompanying, money back if not satisfied.

Price per tube of 25 hypodermic tablets, enough for 10 to 15 operations	$0.30
Per 100, enough for 50 to 75 operations	1.00

Doctor, this is one of the wonders that modern pharmacology and therapeutics is accomplishing for modern surgery and obstetrics. Don't let it get away from you. We have other good things in store.

Just Let This "Sort'o Sink Into Your Soul"

There's No "Dope for Quackery" Made Here

A SQUARE DEAL

The Abbott Laboratories were established by doctors for doctors, and our every thought and interest is for their good and welfare. Our ready-to-dispense alkaloidal (active-principle) preparations and other definite success-making specialties, the highes type of modern pharmacy, meet every requirement) Purity of drug, perfection of handling—protection of the doctor first, and *always* a "square deal,"—is our platform.

We do not Aid or Abet Quackery in Any Form, nor do we Serve the Laity

Our facilities and our abilities are yours. If you are interested, if you would know what we can do for you, write, mentioning this Journal, and complete therapeutic price list with representative samples will be sent.

The Abbott Alkaloidal Company

Manufacturing Chemists

Ravenswood Station - Chicago, Ill.

50 West Broadway, New York. **324 Pacific Block, Seattle, Wash.** **1361 Franklin St., Oakland, Calif.**

Great Britian and Dependencies, Kimberly House, 14 Holborn Viaduct, E. C. London, England

The FOLLOWING PAPERS WILL APPEAR IN EARLY ISSUES OF

Surgery, Gynecology and Obstetrics

TRAUMATIC RUPTURE OF THE KIDNEYS AND BLADDER . . . . . Daniel N. Eisendrath, M. D., Chicago

ECTOPIA TESTIS TRANSVERSUS . . . . Albert E. Halstead, M. D., Chicago

PYELONEPHRITIS OF PREGNANCY . . . . Charles B. Reed, M. D., Chicago

RAPID DILATATION OF THE CERVIX AT TERM . Henry F. Lewis, M. D., Chicago

RESTORATION OF THE ENTIRE URETHRA IN A FIVE YEAR OLD GIRL . . . . . Malcolm L. Harris, M. D., Chicago

GUNSHOT WOUNDS William E. Schroeder, M. D., and E. C. Riebel, M. D., Chicago

RUPTURE OF THE ABDOMINAL WALL WITHOUT INJURY TO VISCERA . . . . . Charles E. Kahlke, M. D., Chicago

TREATMENT OF EXTRAUTERINE PREGNANCY . Aimé-Paul Heineck, M. D., Chicago

PERFORATION OF GASTRIC ULCER; A REPORT OF TWO CASES WITH RECOVERY . . . . . William Hessert, M. D., Chicago

TREATMENT OF HIP DISEASE WITH REFERENCE TO A SPECIAL METHOD . . . . . John Lincoln Porter, M. D., Chicago

RECENT PROGRESS IN SURGERY OF CONJUNCTIVAL SAC Wm. E. Gamble, M. D., Chicago

RUPTURE OF THE URINARY BLADDER; WITH REPORT OF TWENTY-THREE CASES IN COOK COUNTY HOSPITAL . . F. A. Besley, M. D., Chicago

SURGICAL TREATMENT OF APPENDICITIS IN COOK COUNTY HOSPITAL . . . . . Charles Davison, M. D., Chicago

OPERATIVE TREATMENT OF WOUNDS OF THE DIAPHRAGM . . . . . E. Wyllys Andrews, M. D., Chicago

A STUDY OF FRACTURES IN 250 SKELETONS . . C. A. Parker, M. D., Chicago

A COMPARATIVE STUDY OF THE RETICULUM IN SMALL ROUND CELLS AND LYMPH SARCOMA . . . . . M. G. Seelig, M. D., St. Louis

CONCERNING THE MODERN DIAGNOSIS OF KIDNEY LESIONS . . . . . Prof. Kapsammer, M. D., Vienna

PROLAPSE OF THE UTERUS . . . . . Prof. Dührssen, M. D., Vienna

THE SURGERY OF TYPHOID PERFORATION John Wesley Long, M. D., Greensboro, N.C.

COMBINED FRACTURE OF BOTH ENDS OF THE RADIUS John C. Logan, M. D., Pittsburg, Pa.

CERVICAL FISTULA FOLLOWING SUPPURATION IN A PATENT THYRO-GLOSSAL DUCT . . . . . M. G. Seelig, M. D., St. Louis

THE TECHNIQUE OF EXAMINATION OF UTERINE SCRAPINGS . . . . . Ellice McDonald, M. D., New York

OBSERVATIONS UPON THE LYMPH GLANDS IN PREGNANCY . . . . . Arthur W. Meyer, M. D., Baltimore

TEMPERATURE OCCURRING DURING THE PUERPERIUM Geo. H. Ryder, M. D., New York

EXCISION OF THE SCAPULA FOR MALIGNANT GROWTHS Frank J. Intz, M. D., St. Louis

SUPRAPUBIC CYSTOTOMY WITH RETROGRADE CATHETERIZATION . . . . . Arch Dixon, M. D., Henderson, Ky.

CARCINOMA OF THE MALE BREAST . . E. Gregory Connell, M. D., Oskosh, Wis.

MALFORMATIONS OF THE CHIN . . . V. P. Blair, M. D., St. Louis, Mo.

REPORT OF RESULTS OF KIDNEY SURGERY . Prof. Kümmell, Hamburg, Germany

FOREIGN BODIES WITHIN THE VAGINA . Norville W. Sharp, M. D., St. Louis, Mo.

THE TECHNIQUE OF HIP JOINT AMPUTATION . . . Benjamin B. Cates, M. D.

CARCINOMA OF THE UTERUS . . . . . Prof. Wertheim, M. D., Vienna

Discussion by X. O. Werder, M. D., Thomas S. Cullen, M. D., Emil Ries, M. D., Fernand Henrotin, M. D., and John G. Clark, M. D.

THE CONTROL OR ELIMINATION OF PNEUMO-THORAX IN PLEURO-PULMONARY INTERVENTIONS . . . . . Dudley Tate, San Francisco

THE AMERICAN TRUST and SAVINGS BANK

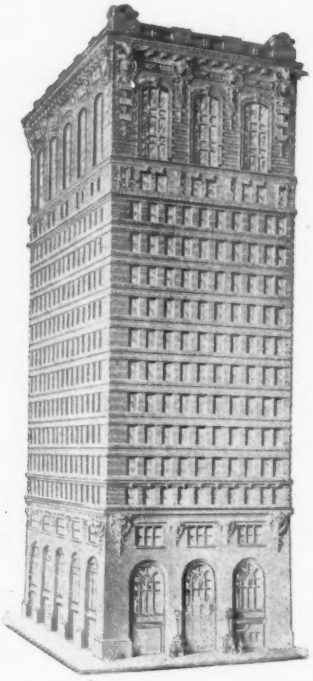
OUR NEW BUILDING CORNER CLARK AND MONROE STREETS

Capital and Surplus

$4,500,000

Deposits

$30,000,000



General Banking

Savings

Trust Department

Bond Department

Safety Vaults

OFFICERS

EDWIN A. POTTER - - -	President	OLIVER C DECKER - -	Assistant Cashier
T. P. PHILLIPS - - -	Vice-President	EDWIN L. WAGNER - -	Assistant Cashier
JAMES R. CHAPMAN - -	Vice-President	FRANK H. JONES - - -	Secretary
JOHN JAY ABBOTT - -	Vice-President	WILLIAM P. KOPF -	Assistant Secretary
CHARLES S. CASTLE - - -	Cashier	GEORGE B. CALDWELL -	Mgr. Bond Dept.
F. J. SCHEIDENHELM - -	Assistant Cashier	WILSON W. LAMPERT - -	Auditor

DIRECTORS

JOY MORTON, E. H. GARY, E. P. RIPLEY, THEODORE P. SHONTS, NORMAN B. REAM
JOHN F. HARRIS, T. P. PHILLIPS, W. H. McDOEL, CHARLES H. THORNE,
E. J. BUFFINGTON, WILLIAM KENT, GILBERT B. SHAW, BENJAMIN THOMAS
CHARLES H. DEERE, JAMES R. CHAPMAN, EWDIN A. POTTER